



TUGAS AKHIR – TI 14501

PENENTUAN KEBIJAKAN OPTIMAL *GROUP PREVENTIVE MAINTENANCE* UNTUK MENINGKATKAN *AVAILABILITY* PERALATAN PADA PERUSAHAAN *LEASING*

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Surabaya 2018

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FINAL PROJECT – TI 14501

**DETERMINING OPTIMAL GROUP PREVENTIVE
MAINTENANCE POLICY TO INCREASE EQUIPMENT
AVAILABILITY IN LEASING COMPANY**

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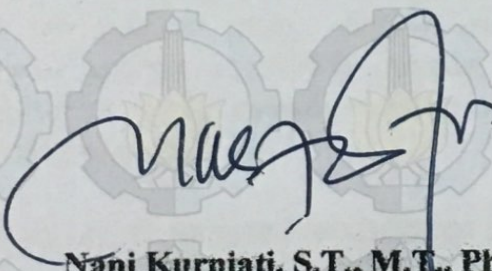
PENENTUAN KEBLIJAKAN OPTIMAL *GROUP PREVENTIVE MAINTENANCE* UNTUK MENINGKATKAN *AVAILABILITY* PERALATAN PADA PERUSAHAAN *LEASING*

TUGAS AKHIR

Diajukan untuk Memenuhi Salah Satu Syarat Memperoleh Gelar Sarjana Teknik
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PERALATAN PADA PERUSAHAAN *LEASING***

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ABSTRAK

Peralatan yang digunakan pada industri pertambangan umumnya menggunakan alat berat dengan jasa *leasing*. *Lessor* menyewakan peralatan kepada perusahaan pertambangan sebagai *lessee*. Ketika terjadi *breakdown* maka perlu dilakukan *maintenance* yang sepenuhnya menjadi tanggung jawab *lessor*. Adapun *lessee* hanya membayar sebesar nilai *availability* aktual. Selain itu, terdapat minimum *availability* yang harus dipenuhi oleh *lessor*. Ketika hanya terdapat satu peralatan yang disewakan, kebijakan optimal PM dapat dengan mudah didapatkan untuk meminimasi biaya PM yang harus dikeluarkan *lessor*. Namun, ketika terdapat beberapa peralatan yang disewakan, jumlah kegiatan PM, kumulatif *downtime*, dan total biaya perawatan akan bertambah seiring dengan bertambahnya jumlah peralatan yang disewakan. Kebijakan *grouping* PM diharapkan dapat menurunkan total biaya perawatan dan meningkatkan *availability*. Pada penelitian ini dilakukan *grouping maintenance* berdasarkan biaya optimal dari semua kemungkinan *grouping* peralatan. Perhitungan *availability* dilakukan setelah didapatkan waktu optimal yang terjadi pada *grouping maintenance policy*. Dengan mengikuti cara ini, group optimal PM sebanyak 6 group dengan *availability* Caterpillar sebesar 96,131% dan Komatsu sebesar 95,6874% dengan jumlah 4 group. Selanjutnya penjadwalan *maintenance* pada masing-masing peralatan dibuat berdasarkan interval waktu optimal *grouping*.

Kata Kunci: *Availability, Grouping Maintenance Policy, Leasing*

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DETERMINING OPTIMAL GROUP PREVENTIVE MAINTENANCE POLICY TO INCREASE EQUIPMENT AVAILABILITY IN LEASING COMPANY

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ABSTRACT

Heavy equipment is the one of commonly used equipment in mining industry, ordinarily the company relies on leasing company to accommodate the heavy equipment. Hereby, the leasing company called as lessor that leases the equipment to mining company as lessee. When the breakdown comes up it needs to do a certain maintenance (PM/CM), thoroughly in charge by the lessor. Lessee would pay the lease as much as actual availability. Moreover, there is a minimum availability which must be met by the lessor. For a single device, the optimal PM policy can be easily derived such that the expected cost to the lessor is minimized. However, for the case where multiple non-identical devices are leased by the same lessee, the number of PM actions, the cumulative downtime, and expected total maintenance cost will increase dramatically according to the optimal PM policy for each device. Grouping PM policy hopefully can increase availability and reduce maintenance cost. Grouping maintenance equipment from all possibility grouping maintenance optimal cost perfomed by this research. Availability measurement done after the optimal time obtained from grouping maintenance policy result. By following these steps, the optimal grouping maintenance for Caterpillar and Komatsu are six and four groups that can increase expected availability approximately 96,131% and 95,6874%, respectively. Scheduling maintenance in each group also done based on the optimum interval time for grouping maintenance.

Keyword: Availability, Grouping Maintenance Policy, Leasing

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Penulis

DAFTAR ISI

| | |
|--|------|
| ABSTRAK | i |
| ABSTRACT | iii |
| KATA PENGANTAR | v |
| DAFTAR ISI | vii |
| DAFTAR GAMBAR | xi |
| DAFTAR TABEL | xiii |
| BAB 1 PENDAHULUAN | 1 |
| 1.1 Latar Belakang | 1 |
| 1.2 Rumusan Masalah | 3 |
| 1.3 Tujuan Penelitian | 4 |
| 1.4 Manfaat Penelitian | 4 |
| 1.5 Ruang Lingkup Penelitian | 4 |
| 1.5.1 Batasan Penelitian | 4 |
| 1.5.2 Asumsi Penelitian | 5 |
| 1.6 Sistematika Penulisan | 5 |
| BAB 2 TINJAUAN PUSTAKA | 7 |
| 2.1 <i>Leasing</i> | 7 |
| 2.1.1 Pengertian Leasing | 8 |
| 2.1.2 Tujuan Leasing | 8 |
| 2.1.3 Syarat-Syarat Leasing | 9 |
| 2.1.4 Jenis-Jenis Leasing | 9 |
| 2.2 Perawatan (<i>Maintenance</i>) | 10 |
| 2.2.1 Konsep Perawatan | 11 |
| 2.2.2 Tujuan Perawatan | 15 |

| | | |
|-----------------------------------|--|----|
| 2.2.3 | Manfaat Perawatan | 15 |
| 2.3 | Keandalan (<i>Reliability</i>) | 16 |
| 2.3.1 | Konsep keandalan..... | 16 |
| 2.3.2 | Fungsi Reliability | 16 |
| 2.3.3 | Failure Rate..... | 17 |
| 2.3.4 | Mean Time to Failure (MTTF) | 18 |
| 2.3.5 | Model Distribusi | 19 |
| 2.3.6 | Failure, Fault, dan Error | 20 |
| 2.3.7 | Failure Mode..... | 20 |
| 2.4 | <i>Grouping Maintenance Policy</i> | 21 |
| 2.4.1 | Optimal Grouping Maintenance Time..... | 22 |
| 2.5 | <i>Availability</i> | 23 |
| 2.6 | Algoritma Genetik | 24 |
| 2.6.1 | Encoding..... | 24 |
| 2.6.2 | Membuat Populasi Awal | 24 |
| 2.6.3 | Evaluasi fitness | 24 |
| 2.6.4 | Mutasi dan Crossover | 25 |
| 2.7 | Penelitian Terdahulu | 25 |
| BAB 3 METODOLOGI PENELITIAN | | 27 |
| 3.1 | Tahap Penelitian Awal | 28 |
| 3.1.1 | Identifikasi Permasalahan..... | 28 |
| 3.1.2 | Perumusan Masalah..... | 28 |
| 3.1.3 | Tujuan Penelitian..... | 29 |
| 3.1.4 | Studi Pustaka | 29 |
| 3.1.5 | Studi Lapangan | 29 |
| 3.2 | Tahap Pengumpulan Data | 29 |

| | | |
|---|---|----|
| 3.3 | Tahap Pengolahan Data..... | 30 |
| 3.3.1 | Identifikasi komponen dan fungsi pada Dump truck..... | 30 |
| 3.3.2 | Penentuan Komponen Kritis Penyebab Kegagalan..... | 30 |
| 3.3.3 | Perhitungan Interval Kegagalan & Failure Rate pada Dump truck | 30 |
| 3.3.4 | Perhitungan Waktu & Biaya Optimal pada Kegiatan Maintenance | 31 |
| 3.3.5 | Penentuan Biaya dan Jumlah Optimal Grouping Maintenance | 31 |
| 3.3.6 | Perhitungan Availability dengan Metode Maintenance Terpilih | 31 |
| 3.4 | Tahap Analisa dan Interpretasi Data | 32 |
| 3.5 | Tahap Penarikan Kesimpulan dan Saran..... | 32 |
| BAB 4 PENGUMPULAN DAN PENGOLAHAN DATA | | 33 |
| 4.1 | Gambaran Umum Perusahaan | 33 |
| 4.2 | Jenis <i>Dump truck</i> yang Disewakan <i>Lessor</i> | 34 |
| 4.3 | Rekapitulasi Biaya..... | 39 |
| 4.3.1 | Biaya Penggantian (C_{ri})..... | 39 |
| 4.3.2 | Biaya Setup (C_s)..... | 44 |
| 4.3.3 | Biaya Minimal repair (C_{mi}) | 44 |
| 4.4 | Kegiatan <i>Maintenance</i> Perusahaan..... | 45 |
| 4.5 | <i>Time to Failure</i> | 45 |
| 4.5.1 | Penentuan Nilai Parameter Time to Faikure pada Dump truck | 46 |
| 4.5.2 | Perhitungan Mean Time to Failure | 48 |
| 4.6 | <i>Time to Repair</i> | 49 |
| 4.6.1 | Penentuan Nilai Parameter Time to Repair pada Dump truck..... | 49 |
| 4.6.2 | Perhitungan Mean Time to Repair | 51 |
| 4.7 | <i>Availability</i> | 52 |
| 4.8 | Validasi Model | 53 |
| 4.9 | Perhitungan Waktu dan Biaya Optimal <i>Grouping Maintenance</i> | 55 |

| | | |
|--|--|----|
| 4.9.1 | Perhitungan Waktu & Biaya Grouping Maintenance Caterpillar.... | 55 |
| 4.9.2 | Perhitungan Waktu & Biaya Grouping Maintenance Komatsu | 59 |
| 4.10 | Kalender <i>Grouping Maintenance</i> dalam Periode 1 Bulan | 63 |
| 4.11 | <i>Availability Grouping Maintenance Policy</i> Perbaikan..... | 65 |
| 4.11.1 | <i>Availability Grouping Maintenance Policy</i> Perbaikan Caterpillar.. | 65 |
| 4.11.2 | <i>Availability Grouping Maintenance Policy</i> Perbaikan Komatsu | 67 |
| BAB 5 ANALISIS DAN INTERPRETASI DATA | | 69 |
| 5.1 | Analisis Perhitungan <i>Mean Time to Failure</i> (MTTF)..... | 69 |
| 5.1.1 | Analisis Perhitungan MTTF Caterpillar | 69 |
| 5.1.2 | Analisa Perhitungan MTTF Komatsu..... | 71 |
| 5.2 | Analisis Perhitungan <i>Mean Time to Repair</i> (MTTR) | 72 |
| 5.2.1 | Analisis Perhitungan MTTR Caterpillar..... | 73 |
| 5.2.2 | Analisis Perhitungan MTTR Komatsu | 74 |
| 5.3 | Analisis Perhitungan Waktu dan Biaya Optimal | 76 |
| 5.3.1 | Analisa Perhitungan Waktu dan Biaya Optimal Caterpillar..... | 76 |
| 5.3.2 | Analisa Perhitungan Waktu dan Biaya Optimal Komatsu | 78 |
| 5.4 | Analisis Kalender <i>Grouping Maintenance</i> dalam Periode 1 Bulan..... | 80 |
| 5.5 | Analisis Perhitungan <i>Availability Grouping Maintenance</i> | 80 |
| 5.5.1 | Analisis <i>Availability Grouping Maintenance</i> Caterpillar | 80 |
| 5.5.2 | Analisis <i>Availability Grouping Maintenance</i> Komatsu..... | 81 |
| BAB 6 KESIMPULAN DAN SARAN | | 83 |
| 6.1 | Kesimpulan | 83 |
| 6.2 | Saran | 84 |
| DAFTAR PUSTAKA..... | | 85 |
| DAFTAR LAMPIRAN | | 87 |

DAFTAR GAMBAR

| | |
|---|----|
| Gambar 2. 1 Elemen yang terdapat pada <i>leasing</i> | 7 |
| Gambar 2. 2 Klasifikasi dari konsep perawatan..... | 12 |
| Gambar 2. 3 Jenis <i>Maintenance</i> untuk <i>repairable item</i> | 14 |
| Gambar 2. 4 Kurva <i>Bathtub</i> dari <i>failure rate</i> | 18 |
| Gambar 2. 5 Perbedaan <i>failure</i> , <i>fault</i> , dan <i>error</i> | 21 |
| Gambar 2. 6 Klasifikasi <i>failure</i> | 21 |
| Gambar 2. 7 Hubungan antara MTTF, MTBF, dan MTTR | 23 |
| Gambar 2. 8 <i>flowchart</i> Algoritma Genetik | 24 |
| Gambar 3. 1 <i>Flowchart</i> Metodologi Penelitian..... | 27 |
| Gambar 4. 1 Input Data <i>Time to Failure</i> pada <i>Software</i> | 47 |
| Gambar 4. 2 Perhitungan parameter <i>Time to Failure</i> oleh Weibull ++6 | 47 |
| Gambar 4. 3 Input Data <i>Time to Repair</i> pada <i>Software</i> | 50 |
| Gambar 4. 4 Perhitungan parameter <i>Time to Repair</i> oleh Weibull ++6 | 50 |
| Gambar 4. 5 <i>Grouping Maintenance</i> k=2 | 54 |
| Gambar 4. 6 <i>Grouping Maintenance</i> k=3 | 54 |
| Gambar 4. 7 <i>Grouping Maintenance</i> k=4 | 55 |
| Gambar 4. 8 <i>Grouping Maintenance</i> k=5 | 55 |
| Gambar 5. 1 Plot Grafik MTTF Caterpillar | 70 |
| Gambar 5. 2 Grafik <i>Failure Rate</i> pada MTTF Caterpillar..... | 70 |
| Gambar 5. 3 Plot Grafik MTTF Komatsu | 71 |
| Gambar 5. 4 Grafik <i>Failure Rate</i> pada MTTF Komatsu | 72 |
| Gambar 5. 5 Plot Grafik MTTR Caterpillar | 73 |
| Gambar 5. 6 Grafik laju perbaikan pada MTTR Caterpillar | 74 |
| Gambar 5. 7 Plot Grafik MTTR <i>dump truck</i> Komatsu HDT2469 | 75 |
| Gambar 5. 8 Plot Grafik MTTR <i>dump truck</i> Komatsu | 75 |
| Gambar 5. 9 Grafik laju perbaikan pada MTTR Caterpillar | 76 |
| Gambar 5. 10 Biaya Optimal <i>Grouping Maintenance</i> Caterpillar Eksisting | 77 |
| Gambar 5. 11 Biaya Optimal <i>Grouping Maintenance</i> Caterpillar Setup Cost 100x Lebih Besar | 78 |

| | |
|---|----|
| Gambar 5. 12 Biaya Optimal <i>Grouping Maintenance</i> Komatsu Eksisting | 79 |
| Gambar 5. 13 Biaya Optimal <i>Grouping Maintenance</i> Komatsu Setup Cost 100x Lebih Besar | 79 |
| Gambar 5. 14 Peningkatan <i>Availability</i> Caterpillar Jangka Panjang..... | 81 |
| Gambar 5. 15 Peningkatan <i>Availability</i> Komatsu Jangka Panjang | 82 |

DAFTAR TABEL

| | |
|--|----|
| Tabel 4. 1 Daftar Kendaraan yang Disewakan..... | 33 |
| Tabel 4. 2 Jenis <i>Dump truck</i> yang Disewakan | 34 |
| Tabel 4. 3 <i>Bill Of Material Dump truck</i> Komatsu HDT465 | 35 |
| Tabel 4. 4 <i>Bill Of Material Dump truck</i> Caterpillar 773E | 37 |
| Tabel 4. 5 Biaya Penggantian pada <i>Dump truck</i> HDT2301 | 39 |
| Tabel 4. 6 Biaya Penggantian pada <i>Dump truck</i> HDT2302..... | 39 |
| Tabel 4. 7 Biaya Penggantian pada <i>Dump truck</i> HDT2306..... | 40 |
| Tabel 4. 8 Biaya Penggantian pada <i>Dump truck</i> HDT2307 | 41 |
| Tabel 4. 9 Biaya Penggantian pada <i>Dump truck</i> HDT2469..... | 41 |
| Tabel 4. 10 Biaya Penggantian pada <i>Dump truck</i> HDT2470..... | 41 |
| Tabel 4. 11 Biaya Penggantian pada <i>Dump truck</i> HDT2471 | 42 |
| Tabel 4. 12 Biaya Penggantian pada <i>Dump truck</i> HDT2472..... | 42 |
| Tabel 4. 13 Biaya Penggantian pada <i>Dump truck</i> HDT2473 | 43 |
| Tabel 4. 14 Biaya Penggantian pada <i>Dump truck</i> HDT2474..... | 43 |
| Tabel 4. 15 Total biaya penggantian <i>dump truck</i> | 44 |
| Tabel 4. 16 Biaya <i>setup</i> berdasarkan jenis <i>dump truck</i> | 44 |
| Tabel 4. 17 Biaya <i>Minimal repair</i> pada <i>Dump truck</i> | 45 |
| Tabel 4. 18 Contoh Rekap Data <i>Time to Failure</i> | 46 |
| Tabel 4. 19 Rekap Parameter <i>Dump truck</i> pada <i>Time to Failure</i> | 47 |
| Tabel 4. 20 Rekap MTTF Seluruh <i>Dump truck</i> | 48 |
| Tabel 4. 21 Contoh Rekap Data <i>Time to Repair</i> | 49 |
| Tabel 4. 22 Rekap Parameter <i>Dump truck</i> pada <i>Time to Repair</i> | 51 |
| Tabel 4. 23 Rekap MTTR Seluruh <i>Dump truck</i> | 52 |
| Tabel 4. 24 Rekapitulasi <i>Availability Dump truck</i> | 52 |
| Tabel 4. 25 Parameter Perhitungan | 53 |
| Tabel 4. 26 Waktu dan Biaya Optimal <i>Grouping Maintenance</i> | 53 |
| Tabel 4. 27 Rekap Notasi Perhitungan Waktu dan Biaya Optimal Caterpillar..... | 56 |
| Tabel 4. 28 Hasil Perhitungan <i>Grouping Maintenance</i> dengan $k = 1$ Caterpillar | 56 |
| Tabel 4. 29 Hasil Perhitungan <i>Grouping Maintenance</i> dengan $k = n$ Caterpillar | 57 |

| | |
|---|----|
| Tabel 4. 30 Rekap Waktu & Biaya Semua Kemungkinan <i>Grouping Maintenance</i> Caterpillar | 58 |
| Tabel 4. 31 Rekapitulasi Notasi Perhitungan Waktu & Biaya Optimal Komatsu. | 59 |
| Tabel 4. 32 Hasil Perhitungan <i>Grouping Maintenance</i> dengan $k = 1$ Komatsu.... | 60 |
| Tabel 4. 33 Hasil Perhitungan <i>Grouping Maintenance</i> dengan $k = n$ Komatsu.... | 61 |
| Tabel 4. 34 Rekapitulasi Waktu dan Biaya Semua Kemungkinan <i>Grouping Maintenance</i> Komatsu | 62 |
| Tabel 4. 35 Kalender Pemeliharaan <i>Dump truck</i> | 64 |
| Tabel 4. 36 Rekapitulasi <i>Availability</i> Semua Kemungkinan <i>Grouping Maintenance</i> Caterpillar | 66 |
| Tabel 4. 37 Rekapitulasi <i>Availability</i> Semua Kemungkinan <i>Grouping Maintenance</i> Komatsu | 67 |

BAB 1

PENDAHULUAN

Pada bab ini akan dijelaskan mengenai latar belakang penelitian, rumusan masalah, tujuan penelitian, manfaat penelitian, ruang lingkup penelitian dan sistematika penulisan.

1.1 Latar Belakang

Dalam industri besar seperti pertambangan batubara, alat berat memiliki peran yang sangat penting dalam menjalankan operasional Kontraktor Kontrak Kerja Sama (K3S). Untuk melakukan pengadaan alat berat, pihak K3S akan membutuhkan dana yang cukup besar, sehingga alternatif yang dapat dilakukan oleh pihak K3S menerapkan skema jasa sewa usaha (*leasing*). Pihak K3S disebut *lessee* dan pihak penyedia alat berat operasional perusahaan, selanjutnya disebut *lessor*. Dalam menjalin kerjasama antara *lessee* dan *lessor*, terdapat *contractual agreement* oleh kedua belah pihak.

Pada bisnis *leasing*, pihak *lessee* memiliki hak guna sepenuhnya atas barang yang disewa, apabila terjadi kerusakan pada alat yang disewa, pihak *lessee* akan kehilangan sebagian hak guna atas peralatan tersebut dan merupakan sebuah kerugian. Oleh karena itu, pihak *lessor* perlu menjamin ketersediaan alat yang disewa agar tidak terjadi kerusakan saat disewakan. Adapun tindakan yang dapat dilakukan *lessor* untuk menjamin ketersediaan alat yang disewakan adalah dengan melakukan *maintenance*. Berikut merupakan KPI *maintenance* yang biasa diterapkan di perusahaan (EAGLECMMS, 2016):

1. Tingkat keandalan pada alat yang dimiliki, dengan melakukan cek MTBF secara periodik
2. Banyaknya pekerjaan yang dapat dikerjakan tepat waktu
3. Seberapa efektif kegiatan *maintenance* yang sudah diterapkan
4. Rasio dari biaya *Maintenance* dengan aset yang dimiliki

Berdasarkan kriteria diatas perusahaan berfokus pada efektivitas *Maintenance* pada kendaraan yang dimiliki untuk mereduksi *downtime* yang terjadi

karena *Maintenance*, hal ini dikarenakan sebagian besar alat yang dimiliki sudah habis masa garansinya (*over warranty*).

Dalam *contractual agreement*, *lessee* memiliki standar terhadap kinerja *lessor*. Apabila pihak *lessor* tidak dapat memenuhi *contractual agreement*, maka pihak *lessor* akan dikenakan *penalty*. Berikut merupakan performansi yang harus dipenuhi oleh *lessor*.

1. Nilai *Availability* minimum kendaraan yang dimiliki adalah 85%
2. Seluruh kegiatan perawatan merupakan tanggung jawab *lessor*, dan tidak termasuk dalam proses bisnis K3S.

Selama masa kontrak, permasalahan yang dimiliki *lessor* adalah tidak terpenuhinya *Availability* pada kendaraan yang dimiliki, hal ini dikarenakan karena kegiatan *Maintenance* masih dilakukan secara individual yang menyebabkan terjadinya penurunan *Availability* kendaraan yang dimiliki *lessor*.

Penurunan *Availability* yang tidak dapat memenuhi *contractual agreement* akan berdampak pada biaya *penalty* yang dibebankan pada *lessor*. Ketika terjadi biaya *penalty*, seluruh peralatan biaya yang terjadi selama kegiatan *corrective Maintenance* dilakukan akan dibebankan pada *lessor*. Selain itu, pihak *lessor* tidak mendapat pemasukan akibat biaya *penalty* ini, hal ini dikarenakan pada *contractual agreement*, *lessee* hanya akan membayar sewa ketika kegiatan operasionalnya berjalan.

Saat ini pihak *lessor* telah menerapkan beberapa strategi *Maintenance*, utamanya *preventive Maintenance*. *Preventive Maintenance* dilakukan untuk mencegah tidak terjadi *failure* secara tiba-tiba, sehingga kegiatan *corrective Maintenance* harus dilakukan.

Kegiatan *preventive Maintenance* yang dilakukan oleh *lessor* contohnya yaitu, penggantian filter dan lubrikasi sesuai dengan rekomendasi *manual book*. Ketika kerusakan terjadi, dalam *manual book* tidak tersedia panduan reparasi sehingga diperlukan kegiatan *corrective Maintenance*. Ketika terjadi kegagalan pada kendaraan selama operasi, kegagalan dapat diperbaiki dengan melakukan *minimal repair*, *imperfect repair*, *perfect repair*, dan *replacement*. Permasalahan yang timbul dari penerapan strategi *corrective Maintenance* diantaranya:

1. Meningkatnya *downtime* pada operasi

2. Terjadinya *penalty* karena target tidak tercapai
3. Turunnya *Availability* secara keseluruhan

Pada pihak *lessor*, apabila sebuah peralatan berjalan paralel yang tindakan perawatannya secara berurutan, maka waktu yang dibutuhkan akan tinggi. Tiap *maintenance* yang dilakukan pada tiap peralatan akan membutuhkan waktu *setup* masing-masing. Waktu *setup* tersebut dapat direduksi dengan menggabungkan beberapa peralatan dalam sekali *maintenance* sehingga waktu *setup* yang dibutuhkan hanya sekali saja. Maka dari itu, diperlukan *Maintenance* yang dilakukan secara simultan pada beberapa jenis peralatan agar kegiatan *Maintenance* dapat berjalan lebih efektif. Pada permasalahan ini *Grouping Maintenance Policy* dapat menjadi solusi untuk mereduksi biaya *maintenance* dan menurunkan nilai *downtime* serta dapat meningkatkan *Availability* dari peralatan. Pada pihak *lessee*, ketika kegiatan *maintenance* dilakukan maka akan mengganggu waktu operasional yang mengakibatkan terjadinya *loss production* pada *lessee*. Berdasarkan fenomena tersebut, terjadi kesepakatan dari kedua belah pihak berupa minimum *availability* oleh pihak *lessee* agar kegiatan operasional *lessee* tidak terganggu oleh kegiatan *maintenance* yang dilakukan oleh *lessor*.

Penerapan *Grouping Maintenance Policy* dilakukan oleh Van *et al.* (2012) untuk menghitung *Availability* berdasarkan berdasarkan jumlah teknisi yang dimiliki. Kemudian Chiu dan Chang (2016), membangun model matematika untuk menentukan waktu dan biaya *optimal Grouping Maintenance*. Lalu dilakukan perhitungan terhadap model yang sudah dibangun, kemudian dibandingkan ketika biaya *individual Maintenance* dan *Grouping Maintenance* diterapkan

Berdasarkan efektivitas proses *Grouping Maintenance*, maka pada penelitian ini akan dilakukan penentuan kegiatan *preventive Maintenance* dengan pertimbangan *Grouping Maintenance Policy* pada jenis kendaraan *dump truck*, untuk meningkatkan *Availability* serta mereduksi biaya *Maintenance*.

1.2 Rumusan Masalah

Berdasarkan latar belakang yang telah dijelaskan sebelumnya, permasalahan yang akan diselesaikan pada penelitian tugas akhir ini adalah

“Menentukan kegiatan *Maintenance* optimal dengan *Grouping Maintenance Policy* untuk meningkatkan *Availability* pada Perusahaan *Leasing*”

1.3 Tujuan Penelitian

Berikut ini akan dijelaskan mengenai tujuan yang ingin dicapai dalam penelitian tugas akhir ini.

1. Menghitung nilai *Mean Time to Failure* dan *Mean Time to Repair dump truck* yang optimal milik *lessor*.
2. Mengidentifikasi jumlah *Grouping Maintenance* optimal pada *dump truck*.
3. Menghitung nilai *Availability Grouping Maintenance* Optimal.
4. Mengevaluasi waktu dan ekspektasi total rata-rata biaya dari *Grouping Maintenance* optimal.
5. Menentukan kalender *Maintenance* dalam periode 1 bulan.

1.4 Manfaat Penelitian

Berikut akan dijelaskan mengenai manfaat yang diperoleh dari hasil penelitian tugas akhir, yaitu:

1. Memberikan alternatif rancangan *Maintenance* yang dapat meningkatkan *availability* pada *dump truck*.
2. Menghasilkan pola *Maintenance* berdasarkan waktu optimal *grouping Maintenance* dan *Availability* yang dimiliki oleh *dump truck*.

1.5 Ruang Lingkup Penelitian

Berikut ini akan dijelaskan mengenai batasan yang digunakan dalam penelitian ini, yaitu:

1.5.1 Batasan Penelitian

Berikut akan dijelaskan mengenai batasan yang digunakan dalam penelitian ini, yaitu:

1. Jenis yang digunakan adalah Caterpillar OHT773 dan Komatsu HD465.

2. Data kegagalan peralatan yang dicatat merupakan data kegagalan yang mengakibatkan kehilangan jam kerja produksi dari bulan Mei 2014 sampai April 2017
3. Penelitian hanya dilakukan pada 1 wilayah kerja, yaitu di wilayah kerja milik *lessor* di Asam-Asam Kalimantan Selatan.
4. Kegiatan *Maintenance* dibedakan berdasarkan merek *dump truck*

1.5.2 Asumsi Penelitian

Berikut akan dijelaskan mengenai asumsi yang digunakan dalam penelitian ini, yaitu:

1. Selama penelitian dilakukan tidak terjadi perubahan kebijakan ataupun perubahan kontrak yang terjadi dari kedua belah pihak
2. Operator dan *Spare Part* yang dibutuhkan untuk melakukan *Maintenance* selalu tersedia
3. Kerusakan yang terjadi pada kendaraan yang dimiliki disebabkan karena umur kendaraan.
4. Kemampuan *operator Maintenance* yang dimiliki oleh *lessor* sudah memenuhi standar yang dimiliki.
5. Umur peralatan mengikuti Distribusi Weibull 2 parameter
6. Perawatan untuk melakukan *grouping maintenance* dilakukan secara paralel

1.6 Sistematika Penulisan

Berikut ini merupakan sistematika penulisan yang digunakan pada penelitian tugas ini.

BAB 1 PENDAHULUAN

Pada bab pendahuluan akan dijelaskan mengenai latar belakang dilakukannya penelitian, rumusan masalah, tujuan penelitian, manfaat penelitian, dan ruang lingkup penelitian yang terdiri atas batasan dan asumsi yang digunakan, serta sistematika penulisan.

BAB 2 TINJAUAN PUSTAKA

Pada bab tinjauan pustaka dijelaskan mengenai teori, konsep dan metode yang akan digunakan penulis dalam melakukan penelitian tugas akhir. Harapannya dapat memberikan konsep kepada pembaca. Tinjauan pustaka yang mendukung penelitian tugas akhir ini adalah *leasing*, perawatan (*Maintenance*) dan keandalan (*reliability*), penjadwalan, model distribusi, serta konsep dari *Group replacement* yang dijadikan acuan sebagai metode untuk memperbaiki kondisi *Maintenance* eksisting.

BAB 3 METODOLOGI PENELITIAN

Pada bab metodologi penelitian dijelaskan mengenai alur pengerjaan penelitian yang dilakukan oleh penulis agar penelitian dapat dilaksanakan secara sistematis, terstruktur, dan terarah.

BAB 4 PENGUMPULAN DAN PENGOLAHAN DATA

Pada bab pengumpulan dan pengolahan data akan dijelaskan mengenai pengumpulan data dan langkah-langkah pengolahan data serta deskripsi singkat mengenai profil perusahaan. Pengumpulan data dilakukan dengan beberapa metode seperti mengumpulkan data-data historis dari perusahaan. Untuk melakukan pengolahan data, dilakukan metode *Grouping Maintenance* yang diambil dari untuk merancang penjadwalan *maintenance* sehingga kegiatan *Maintenance* dapat berjalan lebih efektif dari segi waktu.

BAB 5 ANALISA DAN INTERPRETASI DATA

Pada bab Analisa dan interpretasi data dijelaskan mengenai Analisa data yang dilakukan pada penelitian ini. Analisa yang akan dijelaskan adalah interval waktu inspeksi dan *Maintenance* yang tepat untuk diterapkan pada masing-masing jenis kendaraan yang dimiliki oleh *lessor*

BAB 6 KESIMPULAN DAN SARAN

Pada bab kesimpulan dan saran dijelaskan mengenai kesimpulan yang menjawab dari tujuan penelitian ini. Selain itu, terdapat saran dan rekomendasi yang diberikan untuk perusahaan untuk penelitian lebih lanjut.

BAB 2

TINJAUAN PUSTAKA

Pada bagian tinjauan pustaka akan dijelaskan mengenai teori-teori, konsep, dan metode yang menjadi landasan penulis dalam mengerjakan tugas akhir.

2.1 *Leasing*

Leasing jika diterjemahkan dalam Bahasa Indonesia bermakna “sewa guna usaha”. Pertama kali muncul tahun 1974, melalui surat Keputusan Menteri Keuangan No. Kep-122/MK/2/1974 tanggal 7 Februari 1974 tentang “Perizinan Usaha *Leasing*” (Lestari, 2017). Terdapat beberapa pihak yang bersepakat dalam suatu kontrak sewa guna usaha (Coyle, 2000), diantaranya:

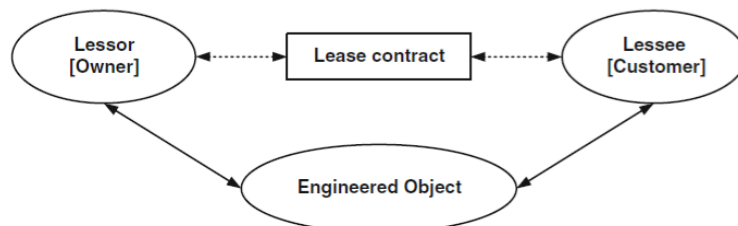
1. *Lessor*

Pihak pertama yang juga berperan sebagai pemilik yang sah dari obyek sewa dan menyewakannya pada pihak lain sampai jangka waktu yang tertulis pada *leasing contract* (LC).

2. *Lessee*

Pihak lain yang menerima pengalihan hak dari *lessor* untuk digunakan sampai jangka waktu yang tertulis pada LC (Murthy & Jack, 2014).

Perjanjian *leasing* antara *lessor* dan *lessee* harus disepakati oleh kedua belah pihak seperti pada gambar 2.1. Jangka waktu yang terdapat pada LC merupakan batas waktu *lessee* menggunakan objek sewa *lessor*. Ketika terjadi terminasi, kedua pihak dapat melanjutkan atau menghentikan *leasing* setelah perjanjian berakhir.



Gambar 2. 1 Elemen yang terdapat pada *leasing* (Murthy & Jack, 2014)

2.1.1 *Pengertian Leasing*

Secara umum *leasing* merupakan kegiatan pembiayaan dalam bentuk penyediaan barang modal untuk digunakan dalam jangka waktu tertentu berdasarkan pembayaran secara berkala. Pembiayaan barang modal yang digunakan nantinya akan digunakan untuk proses bisnis perusahaan secara langsung ataupun tidak langsung (Agnes, 2004). Pengertian *leasing* menurut Keputusan Menteri Keuangan Republik Indonesia No. 1251/KMK/013/1998 pada tanggal 20 Desember 1998, sewa guna usaha yaitu:

- i. Kegiatan yang dilakukan dalam bentuk pengadaan barang modal bagi penyewa guna usaha (*lessee*), baik dengan maupun tanpa hak opsi untuk membeli barang modal tersebut
- ii. Pengadaan barang modal dapat dilakukan dengan membeli barang milik penyewa guna usaha (*lessee*) yang kemudian disewagunausahakan kembali
- iii. Selama perjanjian sewa kontrak masih berlaku, hak milik atas barang modal objek transaksi sewa guna usaha berada di tangan *lessor*.

2.1.2 *Tujuan Leasing*

Tujuan *leasing* secara garis besar terbagi menjadi 4 kategori, berikut merupakan kategorisasi dalam tujuan *leasing* (Scallheim, 1994):

- i. *Tax savings*, proses bisnis dengan *leasing* memiliki keuntungan dalam membayar pajak dalam jumlah yang sedikit, hal ini terjadi karena kepemilikan barang yang disewakan pajaknya dibebankan ke *lessor*.
- ii. *pure financial cost savings*, kepemilikan barang modal menjadi sepenuhnya pada *lessee* untuk menjalankan operasional.
- iii. *transaction and information cost savings*, dalam melakukan pembukuan *outflow* yang terjadi lebih sedikit, khususnya untuk pembelian asset.
- iv. *risk sharing*, risiko yang ditimbulkan tidak sebesar ketika barang modal sepenuhnya dibeli oleh *lessee*.

2.1.3 Syarat-Syarat Leasing

Terdapat beberapa syarat yang terjadi ketika kontrak *leasing* dijalankan, yaitu (Agnes, 2005):

1. Objek *leasing*

Secara umum, objek *leasing* meliputi *consumer product* dan *industrial product*. *Consumer product* seperti mobil, *furniture*, dan keperluan lain yang dibutuhkan oleh rumah tangga, *industrial product* digunakan pada sektor industri seperti pertambangan, karoseri, rumah sakit, dan lainnya.

2. Pihak yang terlibat dalam *leasing*

Penyewa (*lessee*) adalah perseorangan atau perusahaan yang menggunakan barang modal dengan pembiayaan dari perusahaan *leasing* (*lessor*), *lessor* secara legal terdaftar di Departemen Keuangan.

3. Pembayaran berkala dalam jangka waktu tertentu

Pembayaran *leasing* dilakukan secara berkala berdasarkan kesepakatan di awal periode, seperti setiap bulan, triwulan, semester, ataupun tahun.

4. Nilai sisa

Pada perjanjian *leasing* ditentukan nilai sisa, tapi hal ini tidak dikenal dalam perjanjian sewa menyewa

5. Hak opsi bagi *lessee* untuk membeli barang modal *lessor*

Pada akhir masa *leasing*, *lessee* memiliki konsiderat untuk membeli barang modal yang sudah habis masa sewanya sebesar nilai sisa atau mengembalikan kepada pihak *lessor*.

2.1.4 Jenis-Jenis Leasing

Berdasarkan Surat Keputusan Menteri Keuangan No. 1169/KMK.01/1991, jenis-jenis sewa guna usaha diantaranya yaitu:

1. Sewa pembiayaan (*finance lease*)

Sewa yang mengalihkan secara substansial seluruh risiko dan manfaat yang terkait dengan kepemilikan aset. Beberapa karakteristik sewa pembiayaan yaitu:

- i. Aset sewaan bersifat khusus dimana hanya *lessee* yang menggunakannya tanpa dilakukan modifikasi secara material.
- ii. Sewa mengalihkan kepemilikan aset kepada *lessee* pada akhir masa sewa.
- iii. Sewa pembiayaan dapat diamortisasi secara penuh
- iv. Tanggung jawab *Maintenance* sepenuhnya dialihkan pada pihak *lessee*.
- v. *Lessee* memiliki opsi untuk membeli aset pada harga yang cukup rendah dibandingkan nilai wajar pada tanggal opsi mulai dapat dilaksanakan.

2. Sewa Operasi (*Operating leasing*)

Sewa yang tidak mengalihkan secara substansial seluruh risiko dan manfaat yang terkait dengan kepemilikan aset. Berikut merupakan karakteristik sewa operasi yaitu:

- i. *Lessee* tidak memiliki hak membeli barang modal ketika waktu sewa kontrak berakhir
- ii. Kontrak sewa bersifat *cancellable*
- iii. Barang modal yang terdapat pada kontrak tidak bias diamortisasi sampai habis selama *lease period*.
- iv. *Maintenance* merupakan tanggung jawab *lessor*

2.2 Perawatan (*Maintenance*)

Maintenance merupakan suatu aktivitas yang bertujuan agar peralatan atau sistem yang rusak, dikembalikan atau diperbaiki ke kondisi tertentu pada periode waktu tertentu (Ebeling, 1997). Sedangkan menurut Higgs & Mobley (2008) *Maintenance* atau perawatan merupakan suatu kegiatan yang dilakukan secara berulang agar peralatan selalu memiliki kondisi yang sama dengan keadaan awalnya. Kegiatan ini dilakukan untuk menjaga peralatan tetap berada pada kondisi yang diterimanya oleh penggunaannya.

Maintenance merupakan kegiatan untuk menjaga fasilitas/peralatan pabrik dan memperbaiki kegagalan atau mengganti peralatan yang diperlukan agar

kegiatan produksi berjalan sesuai rencana (Assauri, 2008). Sedangkan menurut Setiawan (2008) perawatan merupakan tindakan merawat mesin atau peralatan pabrik dengan memperbarui umur masa pakai dengan cara memperbaiki kegagalan atau kerusakan mesin.

Sehingga dapat disimpulkan bahwa definisi *Maintenance* atau perawatan merupakan kegiatan yang dilakukan untuk memperbaiki kegagalan suatu peralatan atau sistem secara berkala agar tetap pada kondisi yang dapat diterima oleh penggunaanya.

2.2.1 Konsep Perawatan

Terdapat dua klasifikasi secara umum dalam melakukan perawatan, yaitu *planned Maintenance* dan *unplanned Maintenance*. *Planned Maintenance* merupakan pendekatan yang dilakukan dimana kegiatan *Maintenance* telah dijadwalkan berdasarkan periode waktu dan keadaan tertentu, sedangkan *unplanned Maintenance/corrective Maintenance* merupakan kegiatan *Maintenance* yang dilakukan tanpa ada perencanaan waktu ataupun keadaan terlebih dulu. Berdasarkan gambar 2.2 berikut merupakan penjelasan dari framework dari konsep perawatan dibagi menjadi 2, yaitu *planned Maintenance* dan *unplanned Maintenance*:

1. *Planned Maintenance*

Planned Maintenance dibagi menjadi 4 jenis yaitu:

- *Predictive Maintenance*

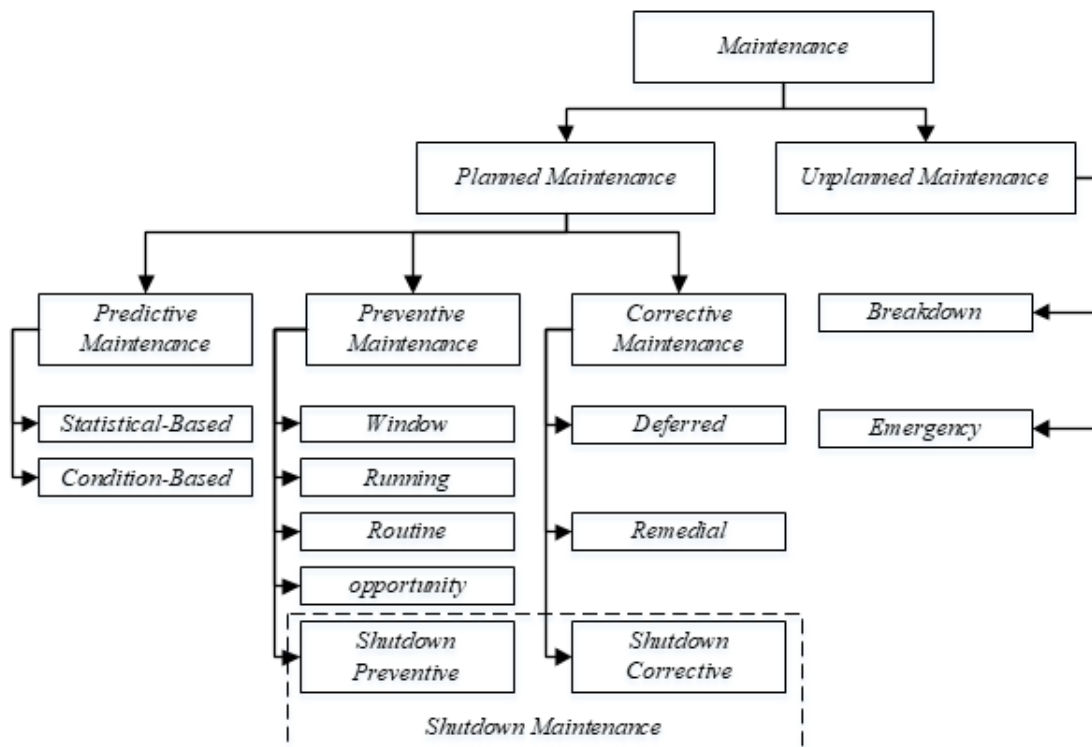
Predictive Maintenance merupakan serangkaian aktivitas yang mendeteksi adanya perubahan kondisi fisik dari alat (tanda-tanda kegagalan), tujuannya untuk mendapatkan kegiatan *Maintenance* yang tepat guna memaksimalkan umur teknis alat. Terdapat 2 metode yang dapat digunakan dalam melakukan *predictive Maintenance* yaitu:

1. *Condition-based predictive Maintenance*

Metode ini tergantung pada *monitoring* yang dilakukan pada peralatan, dapat dilakukan secara kontinyu ataupun secara periodik untuk mendeteksi tanda-tanda kegagalan

2. *Statistical-based predictive Maintenance*

Metode *Maintenance* ini dipengaruhi oleh data statistik yang dicatat secara teliti dari berhentinya suatu operasi pada peralatan guna mengembangkan model untuk memprediksi kegagalan.



Gambar 2. 2 Klasifikasi dari konsep perawatan (Alqaderi, 2014)

- *Preventive Maintenance (PM)*

Preventive Maintenance menurut British Standard 3811:1993 merupakan kegiatan *Maintenance* yang dilakukan pada interval waktu yang telah ditentukan untuk mengurangi kemungkinan gagal dari fungsi sebuah alat. Kegiatan *preventive Maintenance* dibagi menjadi 5 jenis yaitu:

1. *Routine Maintenance*

Merupakan kegiatan *Maintenance* yang dilakukan secara berulang dan periodik seperti lubrikasi dan penyesuaian minor pada peralatan

2. *Running Maintenance*

Merupakan kegiatan *Maintenance* yang dilakukan ketika peralatan yang dimiliki sedang beroperasi. Kegiatan ini umumnya dilakukan sebelum kegiatan aktual PM dilakukan

3. *Opportunity Maintenance*

Merupakan serangkaian kegiatan *Maintenance* yang dilakukan pada peralatan ketika terdapat peluang tidak terencana selama periode *planned Maintenance*.

4. *Window Maintenance*

Merupakan serangkaian kegiatan *Maintenance* yang dilakukan ketika peralatan tidak membutuhkan waktu yang pasti untuk melakukan *Maintenance*

5. *Shutdown preventive Maintenance*

Merupakan serangkaian kegiatan *preventive Maintenance* yang dilakukan ketika lini produksi sedang berhenti beroperasi

- *Corrective Maintenance (CM)*

Corrective Maintenance menurut British Standard 3811:1993 adalah perawatan yang dilakukan setelah diidentifikasi penyebab kerusakan dan mengembalikannya pada titik dimana mesin dapat beroperasi sesuai dengan fungsinya. Perawatan ini dilakukan secara berulang dengan tujuan untuk memperbaiki suatu bagian yang terhenti yang sifatnya darurat dan menjadi prioritas utama (Barry & Heizer, 2001). Pada *corrective Maintenance* diklasifikasikan menjadi 3 macam yaitu:

1. *Remedial Maintenance*

Merupakan serangkaian kegiatan CM yang dilakukan untuk mengeliminasi sumber kegagalan peralatan tanpa mengganggu berlangsungnya proses produksi.

2. *Deferred Maintenance*

Merupakan serangkaian kegiatan CM yang tidak langsung dilakukan ketika terjadi kegagalan, namun tidak mempengaruhi proses produksi.

3. *Shutdown Corrective Maintenance*

Merupakan serangkaian kegiatan CM yang dilakukan ketika lini produksi dalam kondisi berhenti.

2. *Unplanned Maintenance*

Unplanned Maintenance dibagi menjadi 2 jenis yaitu:

- *Breakdown Maintenance*

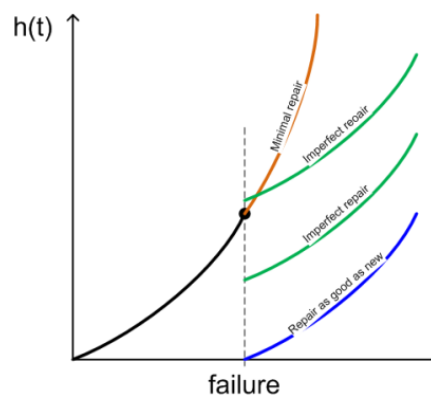
Merupakan kegiatan *Maintenance* yang dilakukan setelah terjadi kerusakan secara mendadak pada peralatan untuk kembali pada keadaan fungsionalnya. Kerusakan dalam hal ini mengakibatkan mesin tidak dapat beroperasi, sehingga untuk memperbaikinya perlu disiapkan *spare part* serta tenaga kerjanya.

- *Emergency Maintenance*

Merupakan kegiatan *Maintenance* yang dilakukan secepat mungkin pada peralatan yang telah gagal/rusak menuju kondisi yang aman dan efisien secara operasional

Menurut Wang & Pham (2006), jenis *Maintenance* untuk *repairable item* dapat diklasifikasikan menjadi 3 jenis yaitu, *perfect*, *imperfect* dan *minimal*. Gambar 2.3 merupakan grafik yang menunjukkan *failure rate* untuk tiap jenis perlakuan *maintenance*:

1. *Perfect*, memperbaiki kondisi barang menjadi bagus seperti baru (*as good as new*)
2. *Imperfect*, memperbaiki kondisi barang menjadi antara seburuk lama dan seperti baru
3. *Minimal*, memperbaiki kondisi barang menjadi sebelum gagal (*as bad as old*).



Gambar 2. 3 Jenis *Maintenance* untuk *repairable item*

Terdapat 2 metode yang digunakan untuk melakukan preventive *Maintenance* pada peralatan, yaitu (Nakagawa, 1981):

- *Age Reduction Method* (ARM), bertujuan agar usia peralatan menjadi lebih muda dari umur teknisnya (*anti-aging*)
- *Failure Rate Reduction Method* (FRRM), bertujuan untuk mengurangi laju kerusakan peralatan.

2.2.2 Tujuan Perawatan

Berikut merupakan tujuan utama pada perawatan (Corder, 1996):

1. Untuk memperpanjang usia kegunaan aset,
2. Untuk menjamin kesiapan operasional seluruh peralatan yang diperlukan setiap keadaan darurat,
3. Untuk menjamin ketersediaan peralatan produksi yang optimum dan memaksimalkan laba investasi
4. Untuk menjamin keselamatan pengguna sarana.

2.2.3 Manfaat Perawatan

Menurut Ahyari (2002), manfaat yang akan didapat ketika perawatan dijalankan dengan baik terhadap mesin adalah sebagai berikut:

1. Mesin dan peralatan produksi yang ada dalam perusahaan yang bersangkutan akan dapat dipergunakan dalam jangka waktu panjang,
2. Pelaksanaan proses produksi dalam perusahaan yang bersangkutan berjalan dengan lancar,
3. Dengan adanya kelancaran penggunaan mesin dan peralatan produksi dalam perusahaan, maka pembebanan mesin dan peralatan produksi yang ada semakin baik.
4. Dapat dihindarkannya kerusakan-kerusakan total dari mesin dan peralatan produksi yang digunakan,
5. Dapat menghindarkan diri atau dapat menekan sekecil mungkin terdapatnya kemungkinan kerusakan-kerusakan berat dari mesin dan peralatan produksi selama proses produksi berjalan,

6. Dapat menghindarkan diri atau dapat menekan sekecil mungkin terdapatnya kemungkinan kerusakan-kerusakan berat dari mesin dan peralatan produksi selama proses produksi berjalan,
7. Apabila mesin dan peralatan produksi berjalan dengan baik, maka penyerapan bahan baku dapat berjalan normal.

2.3 Keandalan (*Reliability*)

Menurut Elsayed (1996) keandalan (*reliability*) merupakan probabilitas dari suatu produk akan beroperasi dengan baik dalam periode waktu yang spesifik berdasarkan kondisi yang sudah didesain lebih dulu tanpa mengalami kegagalan.

2.3.1 Konsep keandalan

Kriteria keandalan dalam segala aspek dalam proses produksi sangat berpengaruh terhadap keberhasilan suatu peralatan, sub-sistem, bahkan sistem produksi akan cukup tangguh untuk tidak mengalami kegagalan dalam jangka waktu tertentu. Penerapan konsep ini dapat membantu untuk mengestimasi berapa lama suatu peralatan, sub-sistem ataupun sistem memiliki peluang untuk selalu melakukan fungsinya dengan baik. Nilai suatu keandalan dapat ditentukan dengan mengetahui nilai laju bahaya (*hazard rate function*), $h(t)$. *Hazard rate function* merupakan alternatif yang dapat digunakan untuk menjelaskan distribusi kegagalan. Hal ini sangat berpengaruh karena biaya yang digunakan untuk melakukan pemeliharaan akan berakibat pada pendapatan perusahaan dalam jangka panjang.

2.3.2 Fungsi Reliability

Keandalan merupakan probabilitas dari suatu produk akan beroperasi dengan baik dalam periode waktu yang spesifik tanpa mengalami kegagalan sampai periode t atau lebih. Fungsi keandalan terhadap waktu dapat dinyatakan sebagai berikut:

$$R(t) = 1 - F(t) = \int_t^{\infty} f(t) dt \quad (2.1)$$

Keterangan:

$f(t)$ = *Probability density function* (pdf)

$R(t)$ = Keandalan (*reliability*)

$F(t)$ = *Cumulative distribution function* (CDF)

2.3.3 Failure Rate

Banyaknya kegagalan per satuan waktu, dapat juga dikatakan sebagai laju kerusakan (h). Laju kerusakan seringkali berubah nilainya pada setiap waktu, namun dalam praktiknya laju kerusakan lebih cenderung konstan dalam periode waktu yang signifikan. Hal ini terjadi karena kalkulasi pada laju kerusakan adalah membandingkan banyaknya kegagalan yang terjadi dibagi dengan total waktu peralatan beroperasi. Laju kerusakan dapat dinyatakan sebagai berikut:

$$h(t) = \frac{f(t)}{T(t)} \quad (2.2)$$

$f(t)$ = Banyaknya kegagalan yang terjadi selama t

$T(t)$ = Total waktu operasi selama t

Laju kerusakan suatu produk akan mengikuti suatu pola dasar yang disebut dengan kurva *bathtub* (Jardine, 1987). Laju kerusakan merupakan faktor yang harus dipertimbangkan selama masa operasi dalam menganalisis kerusakan alat. Terdapat beberapa cara untuk menganalisa kerusakan antara lain:

1. Cara Teknis

Yaitu menganalisa kerusakan alat berdasarkan aspek-aspek teknis dari suatu alat tersebut

2. Cara Statistik

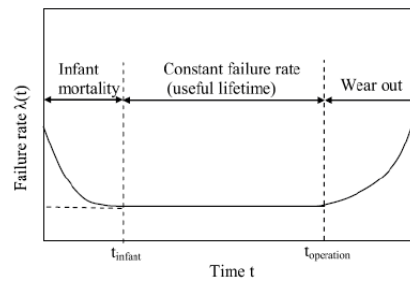
Yaitu menganalisa kerusakan alat dengan menentukan hubungan antara laju kerusakan alat dengan total alat beroperasi.

Menurut Jardine A.K.S (1987), pada gambar 2.3 kurva bathtub memiliki 3 area dengan karakteristik tertentu, yaitu:

1. *Area Infant Mortality*: pada fase ini suatu produk mengalami *burn-in* proses, dimana untuk dilakukan komersialisasi perlu diuji *reliability* dari produk tersebut. Karakteristik *failure rate* yaitu *Decreasing failure rate* (DFR). Fase ini dimulai dari t_0 sampai t_{infant} . Terdapat beberapa alasan yang

menyebabkan terjadinya fase ini, diantaranya yaitu material di bawah standar ketidaksempurnaan perancangan ataupun *quality control* yang tidak memenuhi syarat.

2. *Area Constant Failure Rate*: pada fase ini produk sudah dilakukan komersialisasi oleh pamanufktur. Karakteristik *failure rate* yaitu konstan yang dimulai dari t_{infant} sampai $t_{\text{operation}}$. Fase ini juga biasa disebut dengan *useful life*, kerusakan pada fase ini diakibatkan karena penggunaan peralatan di luar batas kemampuannya.
3. *Area Wear Out*: pada fase ini produk sudah memasuki fase *aging*, dimana kondisi alat yang sudah semakin memburuk karena sudah melebihi umur ekonomisnya. Karakteristik *failure rate* pada fase ini yaitu *increasing failure rate* (IFR), dimulai dari $t_{\text{operation}}$ sampai seterusnya.



Gambar 2. 4 Kurva *Bathtub* dari *failure rate*
Sumber : (Jardine A.K.S, 1987)

2.3.4 Mean Time to Failure (MTTF)

MTTF merupakan nilai rata-rata waktu kegagalan dari sebuah peralatan atau sistem. MTTF dapat pula dikatakan sebagai waktu yang diharapkan untuk dapat beroperasi dengan baik sebelum mengalami kegagalan untuk sistem yang bersifat *non-repairable* (Campbell & Jardine, 2001). Pada MTTF, waktu kegagalan (*failure time*) dari populasi harus mengikuti distribusi normal. Kemudian nilai MTTF dapat dihitung dengan menggunakan perhitungan seperti berikut.

$$\text{MTTF} = \int_0^{\infty} t f(t) dt = \int_0^{\infty} R(t) \quad (2.3)$$

2.3.5 Model Distribusi

Pada peralatan atau fasilitas produksi memiliki distribusi kerusakan yang berbeda-beda. Menurut Connor (2016) beberapa jenis distribusi yang biasa digunakan dalam perhitungan reliability yaitu distribusi *exponential*, distribusi *lognormal*, dan distribusi *weibull*. Identifikasi diperlukan untuk mengetahui distribusi dari masing-masing data interval kerusakan pada mesin, sehingga nantinya penentuan *reliability* tidak terjadi kesalahan dalam melakukan interpretasi.

- Distribusi Weibull

Terdapat 2 parameter pada distribusi Weibull yaitu β_i (*Shape Parameter*) dan α_i (*Scale Parameter*). Fungsi pdf, $f(t)$, yang terdapat dalam distribusi weibull adalah sebagai berikut:

$$f_i(t) = \alpha_i \beta_i (\alpha_i t)^{\beta_i - 1} e^{-(\alpha_i t)^{\beta_i}} \quad (2.4)$$

pada distribusi Weibull, MTTF memiliki formulasi sebagai berikut:

$$MTTF = \alpha_i \Gamma\left(\frac{1}{\beta_i} + 1\right) \quad (2.5)$$

Dimana nilai fungsi gamma dapat didefinisikan sebagai berikut:

$$\Gamma(n) = \int_0^{\infty} e^{-x} x^{n-1} dx \quad (2.6)$$

pada distribusi Weibull, CDF, $F(t)$ memiliki formulasi sebagai berikut:

$$F_i(t) = \alpha_i \beta_i (\alpha_i t)^{\beta_i - 1} \quad (2.7)$$

pada distribusi Weibull, fungsi reliability $R(t)$ memiliki formulasi sebagai berikut:

$$R_i(t) = 1 - F_i(t) = 1 - \alpha_i \beta_i (\alpha_i t)^{\beta_i - 1} \quad (2.8)$$

pada distribusi Weibull, *failure rate*, $h(t)$ memiliki formulasi sebagai berikut:

$$h(t) = \frac{f(t)}{R(t)} = (\alpha_i t)^{\beta_i} \quad (2.9)$$

2.3.6 *Failure, Fault, dan Error*

Menurut IEC50(191), *Failure* merupakan sebuah kejadian ketika fungsi yang dibutuhkan dari sebuah peralatan sudah berakhir, sedangkan *fault* merupakan keadaan dari suatu *item* ditandai dengan ketidakmampuan untuk menghasilkan fungsi yang dibutuhkan. *Fault* dapat pula diartikan sebagai kondisi yang dihasilkan dari sebuah *failure*. Sedangkan *error* merupakan ketidaksesuaian terhadap apa yang sudah diperhitungkan, *error* dapat pula disebut sebagai *incipient failure*.

2.3.7 *Failure Mode*

Failure mode merupakan deskripsi dari sebuah *fault*/kesalahan. Untuk mengidentifikasi failure mode diperlukan penyelidikan dari output yang bermacam-macam. Karena beberapa fungsi memiliki beberapa output, dan beberapa output pun memiliki definisinya masing-masing. Output dapat pula disini diartikan sebagai target dengan deviasi yang dapat diterima, gambar 2.5 merupakan perbedaan antara *failure*, *fault*, dan *error*.

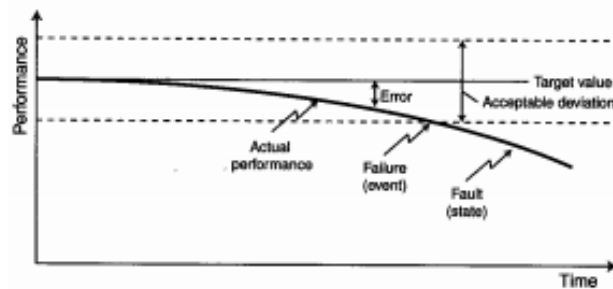
Menurut Blanche dan Shrivastava (1994), failure mode dapat diklasifikasikan sebagai berikut:

1. *Intermittent Failures*, merupakan kegagalan yang berdampak pada berkurangnya fungsi untuk jangka waktu yang cukup pendek.
2. *Extended Failure*, merupakan kegagalan yang berdampak pada berkurangnya fungsi pada beberapa part yang terjadi secara terus-menerus, sampai part tersebut digantikan. *Extended failure* sendiri terbagi menjadi:
 - a. *Complete Failure*, kegagalan yang menyebabkan hilangnya fungsi secara keseluruhan dari sebuah item.
 - b. *Partial Failure*, kegagalan yang membawa pada berkurangnya beberapa fungsi peralatan, namun tidak menyeluruh.

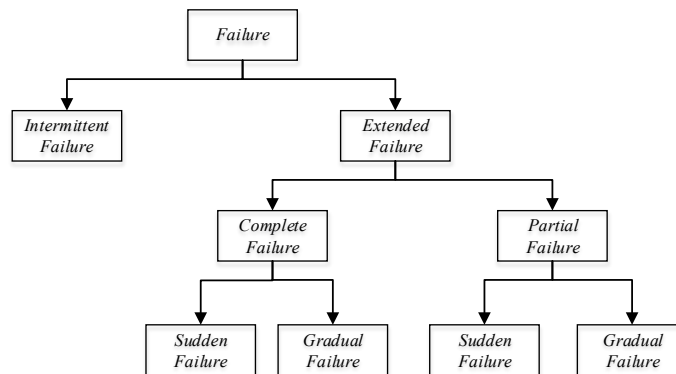
Pada complete dan partial failure, masing-masing diklasifikasikan menjadi 2 bagian yaitu:

- i. *Sudden Failure*, merupakan kegagalan yang tidak dapat dilakukan *forecast*.
- ii. *Gradual Failure*, merupakan kegagalan yang dapat dilakukan *forecast*.

Gambar 2.6 merupakan klasifikasi dari failure mode menurut Blanche dan Shrivastava (1994)



Gambar 2. 5 Perbedaan *failure*, *fault*, dan *error*



Gambar 2. 6 Klasifikasi *failure*

2.4 *Grouping Maintenance Policy*

Menurut Chang et. Al (2016) jika terdapat beberapa peralatan yang berjalan secara paralel, dan operasi dari masing-masing peralatan berjalan secara independen, maka jika terdapat kegagalan pada 1 peralatan tidak akan mempengaruhi operasi dari sistem tersebut. Untuk mengurangi jumlah kegagalan, peralatan sebaiknya diganti pada waktu tertentu. Ketika dilakukan penggantian, maka akan terjadi biaya penggantian dan biaya setup. Dalam situasi ini, *Grouping Maintenance* untuk seluruh peralatan menjadi pertimbangan yang cukup penting untuk mengurangi biaya setup.

Dalam membangun model pada n peralatan yang berjalan secara parallel untuk dilakukan *Grouping Maintenance*, berikut merupakan notasi yang akan digunakan.

$f_i(t)$ *lifetime distribution* yang terdapat pada peralatan ke- i , untuk $i = 1, 2, \dots, n$

$h_i(t)$ laju kerusakan yang terdapat pada peralatan ke- i , untuk $i = 1, 2, \dots, n$

$H_i(t)$ laju kerusakan kumulatif dari peralatan ke-i; $H_i(t) = \int_0^t h_i(u) du$, untuk $i = 1, 2, \dots, n$

C_{mi} biaya minimal perbaikan pada peralatan ke-i, untuk $i = 1, 2, \dots, n$

C_{ri} biaya penggantian pada peralatan ke-i, untuk $i = 1, 2, \dots, n$

C_s biaya setup yang terjadi ketika pergantian dilakukan

T_{gj} waktu pergantian pada *Group* j, untuk $j = 1, 2, \dots, k$ dan $1 \leq k \leq n$

2.4.1 Optimal Grouping Maintenance Time

Pada jurnal ini dijelaskan, jenis distribusi yang digunakan adalah distribusi Weibull 2 parameter. Dengan α sebagai *Scale Parameter* dan β sebagai *Shape Parameter*. Pada distribusi Weibull nilai pdf, failure rate, dan CDF sudah dijelaskan pada subbab sebelumnya. Pada penentuan waktu optimal dibagi menjadi 2 jenis yaitu terdapat n peralatan yang terbagi kedalam 1 kelompok dan k kelompok. Berikut merupakan waktu optimal *Maintenance* pada 1 grup, $T_{g_1}^*$.

$$T_{g_1}^* = \left[\frac{(\sum_{i=1}^n C_{ri}) + C_s}{(\beta-1) \sum_{i=1}^n C_{mi} \alpha_i^\beta} \right]^{\frac{1}{\beta}} \quad (2.10)$$

Ketika terdapat n peralatan yang dibagi menjadi k grup, waktu optimal untuk dilakukan *Maintenance* secara *Group*, $T_{g_j}^*$ untuk $j = 1, 2, \dots, n$ adalah

$$T_{g_j}^* = \left[\frac{C_{rj} + C_s}{(\beta-1) C_{mj} \alpha_j^\beta} \right]^{\frac{1}{\beta}} \quad (2.11)$$

Kemudian untuk mengestimasi rata-rata biaya *Maintenance* pada grup ke-j adalah sebagai berikut

$$E[TC(T_{g_j}^*)] = \frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*} \quad (2.12)$$

Untuk menentukan total biaya *Maintenance* pada satu sistem tersebut adalah sebagai berikut.

$$E[TC(T_{g_1}^*, T_{g_2}^*, \dots, T_{g_k}^*)] = \sum_{j=1}^k \left(\frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*} \right) \quad (2.13)$$

2.5 Availability

Availability merupakan perhitungan untuk mengukur keandalan (*reliability*) dari sebuah peralatan. *Availability* digunakan pada perhitungan peralatan yang bersifat *repairable item*, yaitu kondisi sebuah item mengalami kegagalan dapat diperbaiki ataupun mengganti beberapa komponennya (Wolstenholme, 1999). Perhitungan *Availability* bertujuan untuk menilai efektivitas dari kegiatan perawatan yang dilakukan. Berikut merupakan persamaan yang digunakan untuk mengukur *Availability* suatu peralatan.

$$Availability = \frac{MTBF}{MTBF + MTTR} = \frac{Uptime}{Uptime + Downtime} = \frac{\frac{1}{n\lambda}}{\frac{1}{n\lambda} + \frac{1}{\mu}} = \frac{\mu}{n\lambda + \mu} \quad (2.14)$$

Dimana:

MTBF = *Mean Time Before Failure*

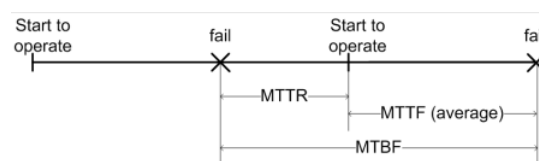
MTTR = *Mean Time to Repair*

Jika sistem berjalan seri yang terdiri dari sejumlah n dengan masa hidup eksponensial maka akan terjadi *steady state Availability*, sehingga:

λ = Laju kegagalan konstan

μ = Lama waktu yang diharapkan untuk melakukan perbaikan

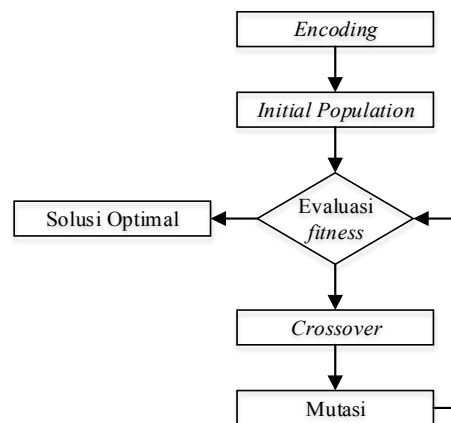
Pada *Availability*, MTBF menunjukkan rata-rata rentang waktu operasi yang dimiliki oleh mesin sampai *breakdown*, MTTR menunjukkan rata-rata waktu yang dibutuhkan untuk memperbaiki mesin agar dapat beroperasi kembali. Untuk *non-repairable item*, *Availability* suatu alat tersebut tidak bisa dilakukan perhitungan secara berkelanjutan. Pada *non-repairable item* biasa dinotasikan dengan *Mean Time to Failure* (MTTF), hal ini dalam konteks *repairable item* biasa disebut dengan MTBF. MTTF merupakan total jumlah umur dari suatu *item* dibagi dengan banyaknya kegagalan yang terjadi pada *item*, selama interval dan kondisi yang telah ditentukan. Gambar 2.7 menunjukkan hubungan antara MTTF, MTBF, dan MTTR.



Gambar 2. 7 Hubungan antara MTTF, MTBF, dan MTTR

2.6 Algoritma Genetik

Algoritma genetik (AG) biasa digunakan untuk memecahkan permasalahan yang bersifat kombinatorial. Dalam algoritma genetik dimulai dengan membuat populasi awal dari solusi, kemudian masing-masing solusi dievaluasi berdasarkan fungsi objektif yang dimiliki. Selama proses iterasi, operasi genetik (*crossover* dan mutasi) digunakan untuk mencari solusi potensial yang lebih baik. Gambar 2.8 merupakan *flowchart* dalam melakukan algoritma genetik.



Gambar 2. 8 *flowchart* Algoritma Genetik

2.6.1 Encoding

Masing-masing solusi diwakili oleh sebuah susunan X , dengan N elemen yang merepresentasikan aktivitas PM. Jika kegiatan *Maintenance* i terdapat pada grup j , maka $X(i) = j$.

2.6.2 Membuat Populasi Awal

Pada algoritma genetik, populasi awal solusi dibuat secara acak atau mengikuti prosedur tertentu, syarat-syarat yang harus dipenuhi menunjukkan suatu solusi harus benar-benar diperhatikan dalam setiap pembuatan setiap individunya.

2.6.3 Evaluasi fitness

Dalam tahap ini, nilai kecocokan (*fitness*) dievaluasi untuk tiap generasinya, kemudian nilai kecocokan yang terbaik dihimpun untuk nantinya dijadikan parents

untuk generasi selanjutnya. Evaluasi ini dilakukan untuk mendapatkan calon induk yang baik, yang akan menghasilkan keturunan yang baik pula nantinya.

2.6.4 *Mutasi dan Crossover*

Tahap selanjutnya yaitu melakukan proses *crossover* (pindah silang) yang merupakan salah satu dari operator algoritma genetika yang melibatkan 2 induk untuk menghasilkan keturunan yang baru, proses *crossover* dilakukan dengan pertukaran gen dari 2 induk secara acak, dan tiap individu terdapat probabilitas *crossover* yang ditentukan. Gambar 2.9 merupakan flowchart dalam melakukan *crossover*.

Mutasi gen merupakan operator yang menukar nilai gen dengan nilai inversinya, semisal nilai gen 0 menjadi 1. Setiap individu mengalami mutasi gen dengan probabilitas mutasi yang ditentukan.

2.7 **Penelitian Terdahulu**

Metode *Grouping Maintenance* dalam penelitian tugas akhir ini mengambil konsep dari *Group replacement*. Hal ini dilakukan untuk meminimasi *downtime* pada produksi yang disebabkan oleh kegiatan *preventive Maintenance* yang dilakukan secara satu-satu (terpisah). Berikut ini akan dijelaskan mengenai beberapa penelitian terdahulu yang berkaitan dengan penelitian yang dilakukan oleh penulis.

1. Penelitian ini dilakukan oleh Rony Affandi Rachman pada tahun 2017 yang berjudul *Analisa Interval Waktu Penggantian Pencegahan Peralatan Kritis Excavator Komatsu PC1250-8R Untuk Meminimasi Breakdown Time di PT XYZ*. Penelitian ini bertujuan untuk menerapkan strategi *Maintenance* yang efektif untuk mereduksi biaya perawatan dan waktu *breakdown*. Pada penelitian ini penulis melakukan Analisa interval penggantian pencegahan/*preventive replacement* peralatan yang kritis *Excavator Komatsu PC1250-8R*. Interval *Maintenance* dilakukan tidak secara berkelompok, sehingga jika *breakdown time* diakumulasikan akan menyebabkan penurunan pada *Availability* peralatan. Penelitian dilakukan dengan mengidentifikasi data *downtime* yang dimiliki pada

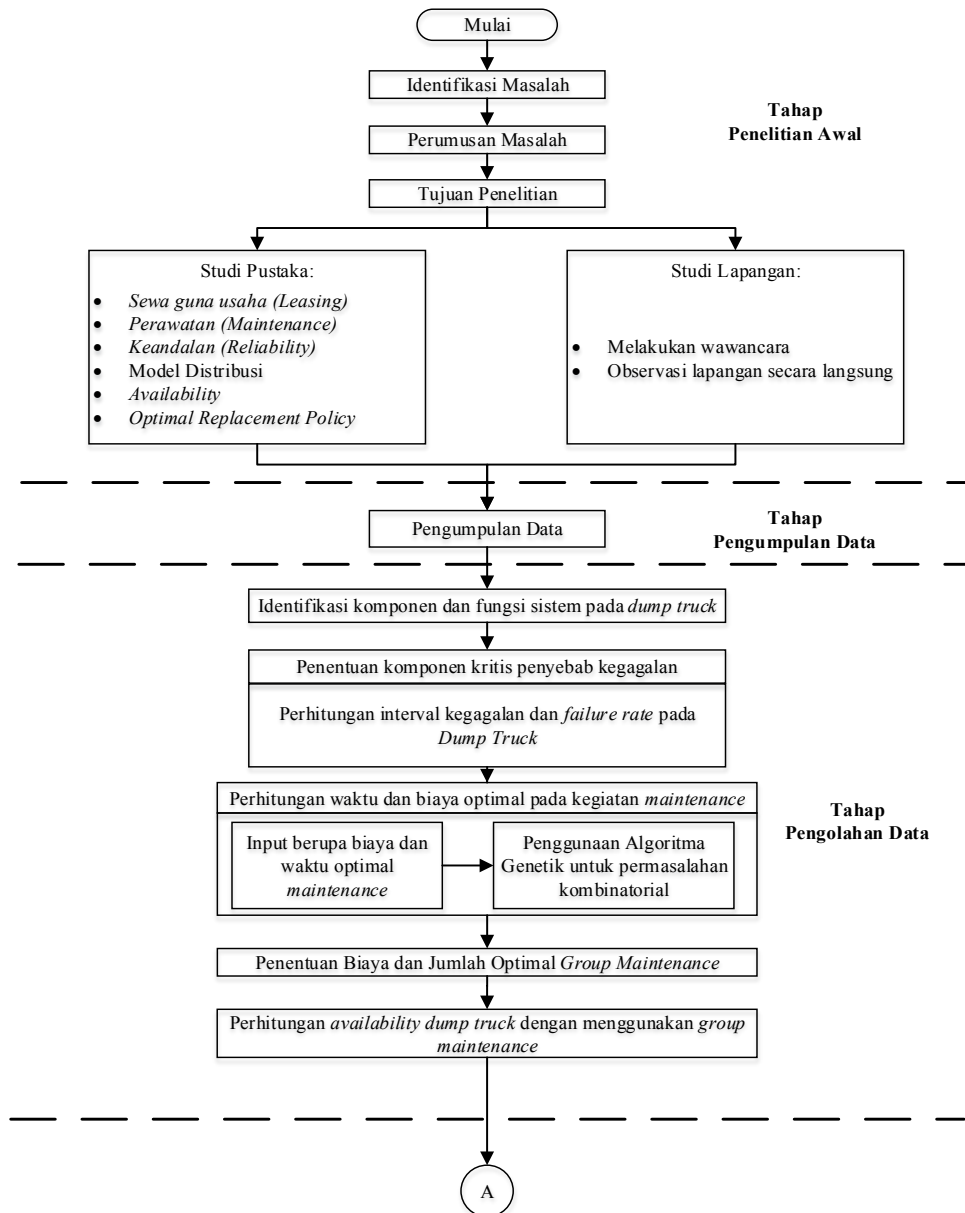
Excavator yang menjadi waktu antar kegagalan, dikonversi ke dalam pareto pada kegagalan yang sering terjadi, lalu melakukan *fitting distribution* pada jenis kegagalan yang dimiliki *excavator*. Hasil *fitting distribution* ini akan dijadikan sebagai *input* diantaranya peluang kegagalan pada excavator, keandalan peralatan, dan nilai *probability density function (pdf)*, sehingga menghasilkan output berupa periode mesin pada suatu periode dapat dihitung.

2. Jurnal penelitian ini dibuat oleh Wen Liang Chang dan Mei Wei Wang tahun 2016, berjudul *Comparisons of Individual and Group Replacement Policies for a Two-machine Series System*. Pada jurnal ini, penulis mengembangkan model yang *replacement Policy* yang masih dilakukan secara individu, diubah menjadi 2 mesin sekaligus dalam melakukan pergantian. Menurut Chang dan Wang (2016) ketika melakukan pergantian mesin muncul biaya penggantian dan biaya *downtime*, ketika biaya downtime tinggi untuk dijalankan secara terpisah, maka akan lebih baik jika penggantian dilakukan secara berkelompok. Dalam pembuatan model yang dibuat, tidak selamanya nilai yang didapat lebih optimal dibanding dengan penggantian secara terpisah. Pertimbangan yang dilakukan adalah ketika waktu penggantian kelompok lebih kecil dibanding minimum waktu penggantian secara terpisah, maka dipilih metode penggantian secara kelompok, begitupun sebaliknya.

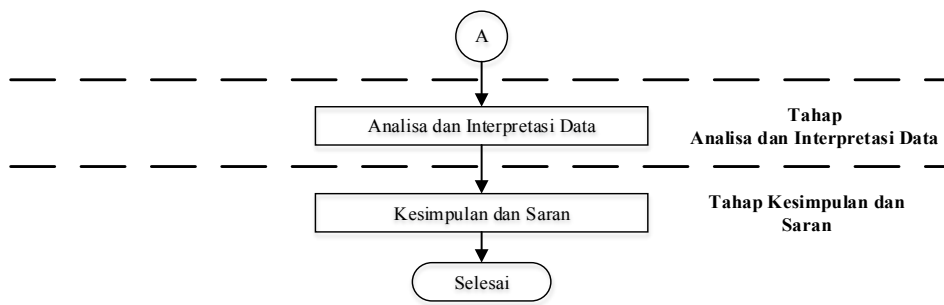
BAB 3

METODOLOGI PENELITIAN

Pada bagian metodologi penelitian, akan dijelaskan mengenai alur pengerjaan dari penelitian, agar nantinya penelitian dapat dilaksanakan secara sistematis dan terstruktur. Berikut merupakan *flowchart* dari metodologi yang dilakukan oleh penulis.



Gambar 3. 1 *Flowchart* Metodologi Penelitian



Gambar 3.1 *Flowchart* Metodologi Penelitian (lanjutan)

Berdasarkan gambar 3.1, tahapan penelitian tugas akhir ini dibagi menjadi 5 tahap, yaitu tahap penelitian awal, tahap pengumpulan data, tahap pengolahan data, tahap Analisa dan Interpretasi data, serta tahap penarikan kesimpulan dan saran.

3.1 Tahap Penelitian Awal

Pada bagian ini akan dijelaskan mengenai identifikasi permasalahan, perumusan masalah dan tujuan penelitian, studi pustaka dan studi lapangan.

3.1.1 Identifikasi Permasalahan

Dalam tahap identifikasi masalah, penulis melakukan identifikasi permasalahan yang ada pada perusahaan. Identifikasi permasalahan dilakukan dengan melakukan pengamatan pada data kerusakan yang dimiliki oleh *lessor* serta melakukan wawancara langsung dengan *Asset Division Manager* perusahaan.

3.1.2 Perumusan Masalah

Setelah dilakukan identifikasi permasalahan pada perusahaan, tahapan selanjutnya yaitu merumuskan masalah. Dalam penelitian ini, kegiatan *Maintenance* yang dilakukan oleh *lessor* masih dilakukan secara terpisah, sehingga *lessor* tidak dapat memenuhi *Availability* yang diinginkan oleh *lessee* yang menyebabkan terjadinya *penalty* dan meningkatnya *downtime* yang berdampak pada kerugian perusahaan.

3.1.3 Tujuan Penelitian

Tujuan dari penelitian tugas akhir ini adalah untuk melakukan menghitung failure rate pada kendaraan *dump truck*, mengidentifikasi semua kemungkinan jumlah *Grouping Maintenance* serta *Availability* dari semua kemungkinan *Grouping Maintenance*, dan mengevaluasi ekspektasi total rata-rata dari semua kemungkinan *Grouping Maintenance*.

3.1.4 Studi Pustaka

Tahapan ini dilakukan untuk memberikan pemahaman akan konsep dasar dan teori yang digunakan oleh penulis untuk mengerjakan penelitian ini. Studi pustaka yang didapat penulis berasal dari berbagai sumber seperti buku, jurnal, *website*, dan lain-lain. Pada penelitian ini studi pustaka yang digunakan meliputi konsep bisnis sewa guna usaha (*leasing*), konsep perawatan, konsep *reliability*, model distribusi, konsep optimal *Maintenance Policy* dengan pertimbangan *Grouping Maintenance*, *Availability*, algoritma genetik dan tinjauan pustaka lain yang mendukung penelitian tugas akhir ini.

3.1.5 Studi Lapangan

Peneliti melakukan studi lapangan untuk mengetahui bagian-bagian yang terdapat pada objek amatan dan data sekunder berupa interval waktu kegagalan pada *dump truck*. Informasi lain yang didapatkan oleh penulis berasal dari wawancara langsung kepada pegawai yang terdapat pada perusahaan yang bertanggung jawab terhadap kegiatan *Maintenance*.

3.2 Tahap Pengumpulan Data

Untuk mendukung penelitian tugas akhir ini, penulis memerlukan data untuk diolah pada bab selanjutnya. Adapun data yang digunakan oleh penulis untuk melakukan penelitian antara lain:

- Data historis interval kerusakan kendaraan, pada bagian yang terdapat pada *dump truck*.

- Data tindakan perawatan yang dilakukan oleh perusahaan yang didapat dengan meminta data sekunder dan melakukan wawancara langsung terkait kondisi kendaraan pada bagian *Maintenance*.
- Data kendaraan yang digunakan untuk operasional berdasarkan *service meter unit* (SMU) yang dimiliki oleh *dump truck*.
- Data pada biaya yang terjadi pada kegiatan *Maintenance* adalah biaya *setup*, biaya setup meliputi biaya downtime dan biaya teknisi.

3.3 Tahap Pengolahan Data

Untuk menentukan jumlah *Group* dan biaya optimal dalam melakukan *Maintenance*, data yang telah diperoleh akan diolah dengan serangkaian tahapan berikut.

3.3.1 Identifikasi komponen dan fungsi pada *Dump truck*

Ketika dilakukan pengolahan data, terlebih dulu dilakukan identifikasi komponen dan fungsi yang terdapat pada *dump truck*. Kegiatan ini dilakukan untuk mengetahui keterhubungan antar komponen yang terdapat pada *dump truck*. Setelah dilakukan identifikasi pada peralatan kendaraan, selanjutnya menentukan komponen kritis yang menyebabkan kegagalan.

3.3.2 Penentuan Komponen Kritis Penyebab Kegagalan

Setelah dilakukan identifikasi fungsi dan komponen pada *dump truck*, selanjutnya menentukan komponen kritis penyebab terjadinya kegagalan. Dalam menentukan komponen kritis kegagalan, banyaknya kegagalan fungsi yang terjadi pada *dump truck* akan dipetakan dalam *pareto chart*. Setelah didapatkan komponen kritis penyebab kegagalan akan dilakukan perhitungan *failure rate* pada komponen yang terdapat pada *dump truck*.

3.3.3 Perhitungan Interval Kegagalan dan *Failure Rate* pada *Dump truck*

Dalam melakukan penentuan nilai *failure rate* pada *dump truck*, terlebih dulu dihitung interval kegagalan komponen yang terdapat pada masing-masing

dump truck yang berakibat munculnya tindakan *corrective Maintenance*. Waktu antar kegagalan didapatkan dari waktu kendaraan selesai dilakukan perbaikan sampai kembali rusak. Dari nilai interval kegagalan pada tiap komponen, akan didapatkan nilai *failure rate* dengan bantuan *software Weibull++6*.

3.3.4 *Perhitungan Waktu dan Biaya Optimal pada Kegiatan Maintenance*

Setelah didapatkan nilai *failure rate*, selanjutnya dapat ditentukan waktu optimal untuk melakukan *Maintenance*. Persamaan 2.10 digunakan untuk menentukan waktu optimal untuk melakukan kegiatan *Maintenance* jika hanya terjadi pada satu *Group*. Sedangkan pada persamaan 2.11 digunakan untuk menentukan waktu optimal yang terdiri dari beberapa *Group*.

Pada perhitungan biaya *Maintenance*, persamaan (2.12) dilakukan untuk mengestimasi biaya *Maintenance* pada grup ke-*j*. setelah dilakukan perhitungan untuk seluruh kemungkinan *Grouping*, total biaya estimasi *Maintenance* pada sistem dapat diperoleh dengan menggunakan persamaan (2.13).

Setelah didapat waktu dan biaya untuk masing-masing skema *Grouping Maintenance*, selanjutnya digunakan operasi algoritma genetik untuk menentukan kombinasi yang terbaik dari semua kemungkinan *Grouping Maintenance* yang ada pada *dump truck*, dengan mempertimbangkan biaya serta lamanya waktu *Maintenance*.

3.3.5 *Penentuan Biaya dan Jumlah Optimal Grouping Maintenance*

Setelah didapatkan kandidat dari semua kombinasi kemungkinan *Grouping Maintenance*, tahap selanjutnya adalah menentukan jumlah yang optimal dan layak dari segi biaya, waktu *Maintenance*, dan biaya setup untuk diterapkan dalam merencanakan kegiatan *preventive Maintenance* pada *dump truck*.

3.3.6 *Perhitungan Availability dengan Metode Maintenance Terpilih*

Pada tahap ini berdasarkan metode *Maintenance* yang terpilih, akan dilakukan perhitungan *Availability dump truck* berdasarkan waktu *Maintenance* yang didapat berdasarkan persamaan (2.14). Peningkatan *Availability* ditandai dengan adanya deviasi antara waktu *Maintenance* eksisting dengan waktu optimal

Maintenance, sehingga menyebabkan nilai *downtime* menurun untuk kegiatan *Maintenance*.

3.4 Tahap Analisa dan Interpretasi Data

Tahap Analisa dan interpretasi data merupakan tahap lanjutan dari pengolahan data, tahap ini akan dilakukan analisa dan interpretasi dari tahap pengolahan data secara detail mengenai hasil-hasil yang didapat pada tahap pengolahan data.

3.5 Tahap Penarikan Kesimpulan dan Saran

Pada tahap akhir ini, akan dilakukan penarikan kesimpulan dari penelitian tugas akhir yang dilakukan. Hasil kesimpulan ini merupakan jawaban dari seluruh tujuan dilakukannya penelitian tugas akhir yang telah ditetapkan sebelumnya. Selain itu, terdapat saran yang dapat dijadikan pertimbangan untuk perusahaan serta terkait penelitian lebih lanjut agar dapat dikembangkan menjadi lebih baik.

BAB 4

PENGUMPULAN DAN PENGOLAHAN DATA

Pada Bab 4 ini akan dijelaskan mengenai pengumpulan dan pengolahan data yang dilakukan oleh penulis. Bab ini berisi mengenai gambaran umum perusahaan, daftar kendaraan yang dimiliki perusahaan, rekapitulasi biaya, kegiatan *Maintenance* pada perusahaan, *Time to Repair*, *Time to Failure*, serta *Availability*.

4.1 Gambaran Umum Perusahaan

Perusahaan yang dijadikan sebagai objek amatan merupakan perusahaan yang memiliki jasa penyewaan alat berat kepada khususnya pada industri pertambangan ataupun pada jasa konstruksi. Adapun mitra yang dimiliki oleh perusahaan terdapat di beberapa daerah di Indonesia diantaranya Bali, Asam-Asam, dan Tanah Bambu.

Adapun alat berat yang disewakan oleh *lessor* pada tiap-tiap wilayah kerja diantaranya *Motor Grader*, *Dump truck*, dan *Excavator*. Pada penelitian ini akan berfokus pada alat berat yang terdapat pada Wilayah Kerja di Asam-Asam, Kalimantan Selatan. Wilayah Kerja ini dipilih karena sebagian besar alat berat yang dimiliki oleh *lessor* banyak dimitrakan pada wilayah kerja ini dan kontrak yang dijalankan antara kedua belah pihak sudah cukup lama, namun minimnya nilai *Availability* yang dimiliki oleh *dump truck* seringkali menjadi kendala bagi *lessor* karena berdampak pada hilangnya biaya sewa dari *lessee*. Oleh karena itu, masalah tersebut menjadi pertimbangan untuk dilakukan penelitian.

Pada tabel 4.1 merupakan daftar alat berat yang dimiliki *lessor* yang disewakan kepada *lessee* sesuai dengan *contractual agreement*.

Tabel 4. 1 Daftar Kendaraan yang Disewakan

| No. | Jenis Kendaraan | Merek | No. Unit | Jumlah | Total (unit) |
|-----|---------------------|-------------|----------|--------|--------------|
| 1 | <i>Excavator</i> | Komatsu | PC1250 | 2 | 2 |
| 2 | <i>Dump truck</i> | Caterpillar | 773E | 4 | 10 |
| | | Komatsu | HD465 | 6 | |
| 3 | <i>Motor Grader</i> | Caterpillar | 16H | 1 | 3 |
| | | Komatsu | GD825 | 1 | |
| | | Caterpillar | 14H | 1 | |

Dari beberapa jenis kendaraan yang disewakan oleh *lessor* kepada *lessee* peneliti akan berfokus pada jenis kendaraan berat *dump truck*. Hal ini dikarenakan jumlah *dump truck* yang sangat banyak dibanding unit lain sehingga akan lebih efektif penggunaan rumus yang dimiliki untuk digunakan pada *dump truck*.

4.2 Jenis *Dump truck* yang Disewakan *Lessor*

Berdasarkan *contractual agreement* yang dimiliki perusahaan berikut merupakan *dump truck* yang disewakan oleh *lessor* beserta nomor unit yang terdapat pada *dump truck*. Pada tabel 4.2 terdapat 10 unit *dump truck* yang disewakan pada *lessee*.

Tabel 4. 2 Jenis *Dump truck* yang Disewakan

| Jenis Alat Berat | Type | No. unit |
|-------------------|------------------|----------|
| <i>Dump truck</i> | Caterpillar 773E | HDT2301 |
| | | HDT2302 |
| | | HDT2306 |
| | | HDT2307 |
| | Komatsu HD465 | HDT2469 |
| | | HDT2470 |
| | | HDT2471 |
| | | HDT2472 |
| | | HDT2473 |
| | | HDT2474 |

Pada tabel 4.3 dan 4.4 merupakan *bill of material* yang terdapat pada *dump truck* Tipe Caterpillar 733E dan Tipe Komatsu HD465

Tabel 4. 3 *Bill Of Material Dump truck Komatsu HDT465*

| Komatsu HD465-7 | | | | | | | |
|-----------------|-----------------------------------|-----------|-----------------------------------|-----------|----------------------------|--------|--------------------------------|
| No. | Component | No. | Component | No. | Component | No. | Component |
| 1.1 | Engine | 1.4.2.5 | Starter Cable | 1.5.4.9 | Sensor | 1.7.11 | Brake Piping |
| 1.1.1 | Engine Mounting | 1.4.2.6 | Mud Cover | 1.5.4.10 | Lubrication Valve | 1.7.12 | Emergency Steering Flow Switch |
| 1.1.2 | Damper | 1.4.2.7 | Auto Priming Pump Piping | 1.5.4.11 | Docking Unit | 1.8 | Main Frame |
| 1.2 | Cooling System | 1.4.3 | Lamp | 1.5.5 | Axle | 1.8.1 | Rear Support |
| 1.2.1 | Radiator | 1.4.3.1 | Rear Lamp | 1.5.5.1 | Front Axle | 1.8.2 | Front Support |
| 1.2.1.1 | Radiator Inner Part | 1.4.3.2 | Beacon Lamp | 1.5.5.1.1 | Front Axle Assembly | 1.8.3 | Engine Oil Filter |
| 1.2.1.2 | Radiator Mounting Part | 1.4.3.3 | Side Lamp | 1.5.5.1.2 | Front Brake Assembly | 1.8.4 | Positioner |
| 1.2.1.3 | Radiator Buffer | 1.4.3.4 | Fog Lamp | 1.5.5.1.3 | Knuckle and Arm Lever | 1.8.5 | Air Intake |
| 1.2.1.4 | Radiator Net | 1.5 | Torque Converter and Transmission | 1.5.5.1.4 | Front Suspension Assembly | 1.8.6 | Exhaust Piping |
| 1.2.1.5 | Radiator Coolant Line | 1.5.1 | Shaft | 1.5.5.1.5 | Suspension Pressure Sensor | 1.8.7 | Muffler |
| 1.2.1.6 | Radiator Electrical System | 1.5.1.1 | Front Propeller Shaft | 1.5.5.1.6 | Brake Oil Piping | 1.8.8 | Engine Earth |
| 1.2.1.7 | Radiator Steering Oil Cooler Line | 1.5.1.1.1 | Front Propeller Shaft Guard | 1.5.5.1.7 | Front Brake Piping | 1.8.9 | Transmission control |
| 1.2.1.8 | Radiator Air Intake | 1.5.1.2 | Rear Propeller Shaft | 1.5.5.1.7 | Mounting Pin | 1.8.10 | Steering Link |
| 1.2.1.9 | Radiator Air Conditioner Piping | 1.5.2 | Hydraulic | 1.5.5.2 | Rear Axle | 1.8.11 | Rear Lubrication Piping |
| 1.2.1.10 | Radiator Fan | 1.5.2.1 | Hydraulic Pump | 1.5.5.2.1 | Rear Differential | 1.8.12 | Tire Stopper |
| 1.2.2 | Coolant Line | 1.5.2.2 | Hydraulic Piping | 1.5.5.2.2 | Rear Wheel Brake | 1.8.13 | Additional Ladder |
| 1.2.3 | Brake Oil Cooler | 1.5.2.2.1 | Steering and Hoist Pump | 1.5.5.2.3 | Final Drive | 1.9 | Operator Compartment |
| 1.3 | Fuel Tank | 1.5.2.2.2 | Retarder Cooling Pump | 1.5.5.2.4 | Rear Axle Housing | 1.9.1 | Operator Cab |

Tabel 4. 3 *Bill Of Material Dump truck Komatsu HDT465 (lanjutan)*

| Komatsu HD465-7 | | | | | | | |
|-----------------|-----------------------------------|-----------|---|-----------|-------------------------|--------|--------------------------|
| No. | Component | No. | Component | No. | Component | No. | Component |
| 1.3.1 | Tank | 1.5.2.2.3 | Torque Converter and Transmission Pump Line | 1.5.5.2.5 | Rear Brake Piping | 1.9.2 | Floor |
| 1.3.2 | Drain Valve | 1.5.2.2.4 | Brake Pump Line | 1.5.5.2.6 | Rear Axle Support | 1.9.3 | Cab Step Mounting |
| 1.3.3 | Strainer | 1.5.2.2.5 | Nipple | 1.5.6 | Torque Assembly | 1.9.4 | Cab Step |
| 1.3.4 | Drain Cover | 1.5.2.2.6 | Transmission Piping | 1.5.7 | Torque Converter Valve | 1.10 | Guard |
| 1.3.5 | Mounting Parts | 1.5.2.2.7 | Breathe Line | 1.5.8 | ECMV Assembly | 1.10.1 | Radiator Guard |
| 1.3.6 | Fuel Line | 1.5.2.2.8 | Pump to Demand Valve Line | 1.6 | Air System | 1.10.2 | Hood |
| 1.3.7 | Water Separater Line | 1.5.2.2.9 | Brake Cooling Piping | 1.6.1 | Auto Suspension Piping | 1.10.3 | Engine Side Cover |
| 1.4 | Electrical System | 1.5.3 | Torque Converter | 1.6.1.1 | Solenoid Valve | 1.10.4 | Fire Protection |
| 1.4.1 | Battery | 1.5.3.1 | Bare Unit | 1.6.1.2 | Support Piping | 1.10.5 | Fender |
| 1.4.1.1 | Mounting Parts | 1.5.3.2 | Input Shaft and Drive Case | 1.6.1.3 | Transmission Piping | 1.10.6 | Engine Under Guard |
| 1.4.1.2 | Battery Box | 1.5.3.3 | Rear Hosing and PTO | 1.7 | Hydraulic System | 1.10.7 | Transmission Under Guard |
| 1.4.1.3 | Battery Switch | 1.5.3.4 | Valve | 1.7.1 | Hydraulic Tank | 1.11 | Rim and Tire |
| 1.4.1.4 | Emergency Steering Relay | 1.5.4 | Transmission | 1.7.2 | Dump Control | 1.12 | Body |
| 1.4.1.5 | Circuit Breaker | 1.5.4.1 | Reverse Housing | 1.7.3 | Parking Brake Line | 1.12.1 | Hoist cylinder |
| 1.4.1.6 | Rear Hood | 1.5.4.2 | High Housing | 1.7.4 | Accumulator Piping | 1.12.2 | Body Liner |
| 1.4.1.7 | Hood | 1.5.4.3 | Low Housing | 1.7.5 | Transmission Piping | 1.12.3 | Body Side Extension |
| 1.4.2 | Electrical System | 1.5.4.4 | Carrier | 1.7.6 | Steering Cylinder | 1.12.4 | Spill Guard |
| 1.4.2.1 | Main Harness | 1.5.4.5 | Case | 1.7.7 | Cross Over Relief Valve | 1.12.5 | Platform Guard |
| 1.4.2.2 | Auto Priming Pump | 1.5.4.6 | Input and Output | 1.7.8 | Hydraulic Piping | 1.12.6 | Exhaust Box |
| 1.4.2.3 | Cab Harness | 1.5.4.7 | Control Valve | 1.7.9 | Brake Cooling Piping | | |
| 1.4.2.4 | Sensor and Harness Mounting Parts | 1.5.4.8 | Oil Tank | 1.7.10 | Brake Cooling Oil Line | | |

Tabel 4. 4 Bill Of Material Dump truck Caterpillar 773E

| Caterpillar 773E/BDA00001-UP | | | | | |
|------------------------------|------------------------------|---------|--------------------------------|----------|--|
| No. | Komponen | No. | Komponen | No. | Komponen |
| 1.1 | Machine Arrangement | 1.5.9 | Turbocharger | 1.8.5 | Final Drive |
| 1.1.1 | Chassis Arrangement | 1.5.10 | Valve and Mounting | 1.8.6 | Filter Oil |
| 1.1.2 | General Arrangement | 1.5.11 | Valve Solenoid | 1.8.7.3 | Torque Converter |
| 1.2 | Basic Engine | 1.6 | Fuel System | 1.8.7.4 | Traction Aid |
| 1.2.1 | Air Compressor | 1.6.1 | Adapter Fast Fill Fuel | 1.8.8 | Motor Electric |
| 1.2.2 | Belt Tensioner | 1.6.2 | Drive Inector Hydraulic Pump | 1.8.9 | Manifold Torque Converter |
| 1.2.3 | Camshaft | 1.6.3 | Injector Fuel | 1.8.10 | Rim <i>Group</i> |
| 1.2.4 | Cover | 1.6.4 | Kit-Compensator | 1.8.11 | Shaft Drive |
| 1.2.5 | Crankshaft | 1.6.5 | Kit-Seal | 1.8.12 | Slip Joint |
| 1.2.6 | Cylinder Block | 1.6.6 | Tank Fuel | 1.8.13 | Tire and Rim |
| 1.2.7 | Cylinder Head | 1.6.7 | Fuel Filter | 1.8.14.7 | Wheel |
| 1.2.8 | Damper | 1.6.8 | injector Hydraulic Pump | 1.9 | Frame and Body |
| 1.2.9 | Drive <i>Group</i> | 1.6.9 | Fuel Injection | 1.9.1 | Body and Canopy |
| 1.2.10 | Flywheel | 1.6.10 | Primary Filter | 1.9.2 | Cowling |
| 1.2.11 | Gear <i>Group</i> | 1.6.11 | Injector Hydraulic | 1.9.3 | Fender |
| 1.2.12 | Lifting Engine | 1.6.12 | Fuel | 1.9.4 | Frame |
| 1.2.13 | Piston & Rod <i>Group</i> | 1.7 | Electrical and Starting System | 1.9.5 | Guard <i>Group</i> - Drive Shaft |
| 1.2.14 | Pulley Crankshaft | 1.7.1 | Alarm | 1.9.6 | Handhold |
| 1.2.15 | Rocker Arm | 1.7.2 | Alternator Charging | 1.9.7 | Handrail |
| 1.2.16 | Seal Crankshaft | 1.7.3 | Application Monitor | 1.9.8 | Ladder |
| 1.2.17 | Trunnion Enginee | 1.7.4 | Battery and Wiring | 1.9.9 | Mirror |
| 1.2.18 | V-Belt set | 1.7.5 | Electronic <i>Group</i> | 1.9.10 | Suspension |
| 1.2.19 | Valve Mechanism <i>Group</i> | 1.7.5.1 | Machine | 1.9.11 | Walkway <i>Group</i> |
| 1.3 | Lubrication System | 1.7.5.2 | Monitor | 1.9.12 | Valve <i>Group</i> - Lube Distribution |
| 1.3.1 | Control Pre-Lubrication | 1.7.5.3 | Power Train | 1.10 | Breaking System |
| 1.3.2 | Extension Drain | 1.7.6 | Heater | 1.10.1 | Air Dryer |
| 1.3.3 | Fastener Oil Pump Mounting | 1.7.7 | Lamp <i>Group</i> | 1.10.2 | Break <i>Group</i> |

Tabel 4. 4 *Bill Of Material Dump truck Caterpillar 773E* (lanjutan)

| Caterpillar 773E/BDA00001-UP | | | | | |
|------------------------------|------------------------------|---------|--------------------------------|--------|-------------------|
| No. | Komponen | No. | Komponen | No. | Komponen |
| 1.3.4 | Filler Engine Oil | 1.7.7.1 | Dome | 1.10.3 | Parking System |
| 1.3.6 | Fumes Disposal | 1.7.7.2 | Flood | 1.10.4 | Service Brake |
| 1.3.7 | Gauge Oil level | 1.7.7.3 | Head | 1.10.5 | Slack Adjuster |
| 1.4 | Cooling System | 1.7.7.4 | Rear | 1.10.6 | Air Control |
| 1.4.1 | Core Oil Cooler | 1.7.7.5 | Signal | 1.10.7 | Brake |
| 1.4.2 | Fan Suction | 1.7.8 | Panel Group | 1.10.8 | Diverter |
| 1.4.3 | Lines Coolant Drain | 1.7.8.1 | Circuit Breaker | 1.10.9 | Solenoid |
| 1.4.4 | Lines Water | 1.7.8.2 | Fuse | 1.11 | Steering System |
| 1.4.5 | Pump Water | 1.7.9 | Sensor | 1.11.1 | Cylinder Steering |
| 1.4.6 | Radiator | 1.7.9.1 | Sensor Position | 1.11.2 | Pump Group |
| 1.5 | Air Inlet and Exhaust System | 1.7.9.2 | Sensor Pressure | 1.11.3 | Steering Gear |
| 1.5.1 | Aftercooler | 1.7.9.3 | Sensor Sped | 1.11.4 | Tank and Filter |
| 1.5.2 | Air Cleaner | 1.7.9.4 | Sensor Temprature | 1.11.5 | Tank Hydraulic |
| 1.5.3 | Control Exhaust Flow | 1.7.10 | Switch Group | 1.11.6 | Wheel Front |
| 1.5.4 | Exhaust Arrangement Engine | 1.7.11 | Wiring Group | 1.12 | Hydraulic System |
| 1.5.5 | Manifold Exhaust | 1.8 | Power Train | 1.12.1 | Actuator |
| 1.5.6 | Muffler | 1.8.1 | Actuator | 1.12.2 | Cylinder Hoist |
| 1.5.7 | Pipe Exhaust | 1.8.2 | Control Traction | 1.12.3 | Hydraulic |
| 1.5.8 | Precleaner Group | 1.8.3 | Control Transmission Hydraulic | 1.12.4 | Rotating Pump |

4.3 Rekapitulasi Biaya

Pada subbab ini akan dilakukan rekapitulasi biaya untuk menghitung jumlah grup untuk melakukan *Maintenance*, biaya, dan waktu optimal yang diinginkan *lessor*, pada persamaan 2.10 terdapat beberapa komponen biaya yang diperlukan untuk mendapatkan waktu yang optimal untuk melakukan *Grouping Maintenance*. Adapun komponen biayanya yaitu biaya penggantian (C_{ri}), biaya setup (C_s), dan biaya *minimal repair* (C_{mi}).

4.3.1 Biaya Penggantian (C_{ri})

Biaya penggantian merupakan seluruh komponen biaya yang terjadi pada masing-masing komponen ketika *Grouping Maintenance* dilakukan. Tabel 4.5-4.14 merupakan komponen yang sudah dilakukan penggantian dan biaya yang timbul dari masing-masing penggantian pada tiap *dump truck* yang dimiliki.

Tabel 4. 5 Biaya Penggantian pada *Dump truck* HDT2301

| HDT2301 | | | |
|------------------|-------------|----------------|--------------|
| Tanggal | Komponen | Product Number | Price |
| March 8, 2015 | BEARING AS | 295-4427 | Rp4.800.555 |
| | RING | 7J9885 | Rp251.527 |
| | SEAL WIPER | 289-2956 | Rp19.952 |
| | RING WEAR | 8T5668 | Rp31.082 |
| | SEAL U CUP | 289-2948 | Rp14.523 |
| | SEAL AS | 289-2937 | Rp17.916 |
| | SEAL AS | 4T8054 | Rp27.689 |
| | SEAL | 2G9491 | Rp161.250 |
| | O RING | 9X7381 | Rp3.800 |
| August 25, 2016 | BATTERY | 08000-02215 | Rp1.949.000 |
| August 29, 2016 | SENSOR | 258-4521 | Rp950.110 |
| | SENSOR | 167-1709 | Rp836.096 |
| | HOSE | 140-6022 | Rp6.083.055 |
| | PUMP GP OIL | 10R-1001 | Rp61.134.305 |
| January 21, 2017 | KIT SHOCK | 212-7779 | Rp3.779.809 |
| Total | | | Rp80.060.669 |

Tabel 4. 6 Biaya Penggantian pada *Dump truck* HDT2302

| HDT2302 | | | |
|------------------|-------------|----------------|--------------|
| Tanggal | Komponen | Product Number | Price |
| January 13, 2015 | SEAL G | 314-4120 | Rp3.601.351 |
| | SEAL G | 297-9546 | Rp13.274.971 |
| | RING SEAL | 9X7307 | Rp196.666 |
| | SEAL O RING | 7D7519 | Rp279.583 |
| | RING SEAL | 123-2941 | Rp123.333 |
| | SEAL O RING | 2M9780 | Rp112.500 |
| | SEAL O RING | 8L9241 | Rp124.861 |

| HDT2302 | | | |
|-------------------|--------------------|----------------|---------------|
| Tanggal | Komponen | Product Number | Price |
| | SEAL O RING | 4S5924 | Rp165.416 |
| | SEAL O RING | 9M5892 | Rp141.944 |
| February 12, 2015 | GASKET | 239-1388 | Rp155.416 |
| | SEAL | 126-2702 | Rp88.889 |
| | GASKET | 1S4295 | Rp132.777 |
| | CLAMP V BAND | 189-3620 | Rp126.666 |
| February 17, 2015 | RING WEAR | 8T7694 | Rp475.138 |
| | SEAL U CUP | 327-1055 | Rp643.002 |
| | SEAL O RING | 2H5001 | Rp226.111 |
| | SEAL CUP | 9X7333 | Rp235.972 |
| | RING | 4J6557 | Rp122.638 |
| | SEAL O RING | 9M5024 | Rp123.750 |
| | SEAL O RING | 9X7385 | Rp121.527 |
| October 9, 2015 | BEARING STABILIZER | 6J1144 | Rp801.388 |
| | SENSOR GP | 258-4521 | Rp1.486.111 |
| October 14, 2015 | BATTERY | 08000-02215 | Rp1.949.000 |
| February 6, 2016 | CLAMP V BAND | 189-3620 | Rp126.666 |
| February 25, 2016 | SPIDER GP | 173-0888 | Rp1.944.444 |
| February 29, 2016 | LINNING | 114-9299 | Rp1.656.111 |
| January 21, 2017 | ALARM AS BACK | 213-9100 | Rp1.385.416 |
| | PUMP GP OIL | 10R1001 | Rp61.134.305 |
| | BATTERY | 08000-02215 | Rp1.949.000 |
| | SENSOR GP | 258-4521 | Rp1.486.111 |
| | SENSOR GP | 185-0600 | Rp6.365.905 |
| | SENSOR GP | 194-6724 | Rp1.006.944 |
| | SENSOR GP PR | 167-1709 | Rp2.988.888 |
| | DRYER | 3E3535 | Rp393.750 |
| | MIRROR ASSY | 5P6877 | Rp1.254.458 |
| 30-Apr-2017 | BATTERY N150 | 08000-02215 | Rp1.949.000 |
| Total | | | Rp108.350.008 |

Tabel 4. 7 Biaya Penggantian pada *Dump truck* HDT2306

| HDT2306 | | | |
|-------------------|--------------------|----------------|--------------|
| Tanggal | Komponen | Product Number | Price |
| February 5, 2015 | BATTERY | N200AH | Rp9.430.555 |
| February 26, 2015 | PUMP GP OIL (HEUI) | 10R-1001 | Rp61.134.305 |
| April 10, 2015 | RING | 3S2909 | Rp140.694 |
| | COVER | 7D5435 | Rp295.000 |
| | WASHER | 8X8431 | Rp694.027 |
| | BEARING | 295-4427 | Rp4.800.555 |
| | SEAL | 2G9491 | Rp161.250 |
| May 24, 2015 | SEAL U CUP | 327-1055 | Rp643.002 |
| | RING WEAR | 8T7695 | Rp949.583 |
| June 8, 2016 | BEARING | 6B1124 | Rp128.333 |
| | BEARING | 3L1425 | Rp349.444 |
| | BEARING | 8H9789 | Rp306.250 |
| | HUB CLA | 296-1357 | Rp1.776.388 |
| | PULLEY | 6N3641 | Rp1.153.194 |
| October 29, 2016 | KIT SHOCK | 212-7779 | Rp3.779.809 |
| December 7, 2016 | SENSOR GP | 258-4521 | Rp1.486.111 |
| December 8, 2016 | BACK UP ALARM | 370-1485 | Rp1.041.666 |

| HDT2306 | | | |
|----------------|----------|----------------|--------------|
| Tanggal | Komponen | Product Number | Price |
| April 10, 2017 | BEARING | 6J1144 | Rp801.388 |
| Total | | | Rp89.071.554 |

Tabel 4. 8 Biaya Penggantian pada *Dump truck* HDT2307

| HDT2307 | | | |
|-------------------|---------------------|----------------|---------------|
| Tanggal | Komponen | Product Number | Price |
| January 5, 2015 | DRYER | 3E3535 | Rp393.750 |
| November 19, 2015 | HEUI PUMP | 10R-1001 | Rp61.134.305 |
| December 31, 2015 | HOSE AS | 7E-9227 | Rp1.544.583 |
| | HOSE AS | 7C-9452 | Rp1.582.361 |
| | HOSE AS | 138-7864 | Rp2.157.638 |
| | HOSE AS | 140-6022 | Rp6.083.055 |
| | HOSE AS | 7D-4086 | Rp2.190.277 |
| February 29, 2016 | CLAMP V BAND | 135-7904 | Rp2.140.277 |
| August 7, 2016 | KIT SHOCK | 189-3620 | Rp126.666 |
| August 25, 2016 | BATTERY | 212-7779 | Rp3.779.809 |
| August 29, 2016 | HOSE AS | 08000-02215 | Rp1.949.000 |
| | PIN | 174-7567 | Rp4.236.666 |
| | HOSE | 9D2205 | Rp1.305.277 |
| | PUMP GP OIL | 140-6022 | Rp6.083.055 |
| September 4, 2016 | BASE | 10R-1001 | Rp61.134.305 |
| October 31, 2016 | HEUI PUMP | 106-9488 | Rp1.250.000 |
| January 23, 2017 | AIR PRESSURE SENSOR | 10R1001 | Rp61.134.305 |
| March 10, 2017 | COMPRESSOR | 185-0600 | Rp6.365.905 |
| Total | | | Rp19.957.222 |
| | | | Rp244.548.456 |

Tabel 4. 9 Biaya Penggantian pada *Dump truck* HDT2469

| HDT2469 | | | |
|-------------------|---------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| October 18, 2015 | BATTERY | 08000-02220 | Rp2.535.000 |
| February 22, 2016 | HOSE HOIST | 07098-01009 | Rp2.577.916 |
| May 13, 2016 | BEARING | 6245-61-3960 | Rp217.510 |
| May 19, 2016 | HOSE | 561-61-65330 | Rp207.981 |
| January 24, 2017 | CAP | 07051-01000 | Rp221.653 |
| March 11, 2017 | BEARING | 561-27-61960 | Rp4.347.722 |
| | BEARING | 569-27-61912 | Rp3.848.277 |
| | PAD | 566-3205221 | Rp4.123.790 |
| Total | | | Rp18.079.849 |

Tabel 4. 10 Biaya Penggantian pada *Dump truck* HDT2470

| HDT2470 | | | |
|-------------------|-----------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| October 18, 2015 | BATTERY | 08000-02220 | Rp2.535.000 |
| February 14, 2016 | SENSOR | 569-06-83410 | Rp940.266 |
| January 4, 2017 | BODY AS | 569-01-72600 | Rp20.789.852 |
| | COUPLING | 569-01-62720 | Rp8.009.355 |
| April 20, 2017 | BUSHING END ROD | 569-52-41920 | Rp952.281 |
| | PIN | 569-52-81150 | Rp7.465.150 |
| April 29, 2017 | BUSHING END ROD | 569-52-41920 | Rp952.281 |

| HDT2470 | | | |
|---------|---------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| | PIN | 569-52-81150 | Rp7.465.150 |
| Total | | | Rp49.109.335 |

Tabel 4. 11 Biaya Penggantian pada *Dump truck* HDT2471

| HDT2471 | | | |
|-------------------|---------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| March 15, 2015 | RING BACK UP | 5J6444 | Rp121.527 |
| | SEAL O RING | 1H8278 | Rp152.777 |
| | SEAL U CUP | 327-1055 | Rp643.002 |
| | SEAL LIP | 9X7333 | Rp235.972 |
| | SEAL RING | 5J1731 | Rp266.527 |
| | RING WEAR | 8T7692 | Rp1.000.694 |
| | RING WEAR | 8T7695 | Rp949.583 |
| | O RING | 4J0524 | Rp85.694 |
| | O RING | 4J0527 | Rp138.194 |
| March 30, 2015 | BEARING | 7J-1309 | Rp513.055 |
| October 25, 2015 | BATTERY | 08000-02220 | Rp2.535.000 |
| April 3, 2016 | SPACER | 6245-61-3450 | Rp308.036 |
| | BEARING BALL | 06330-06208 | Rp218.339 |
| | OIL SEAL | 07012-00050 | Rp1.009.455 |
| | INNER RACE | 6127-61-3920 | Rp218.753 |
| | SEAL | 6245-61-3970 | Rp12.367.435 |
| September 3, 2016 | BATTERY N200 | 08000-02220 | Rp2.535.000 |
| January 24, 2017 | BATTERY | 08000-02215 | Rp1.949.000 |
| February 16, 2017 | BEARING | 6245-61-3960 | Rp217.510 |
| | RACE | 6127-61-3920 | Rp218.753 |
| | BELT | 6245-61-3360 | Rp551.026 |
| Total | | | Rp26.235.332 |

Tabel 4. 12 Biaya Penggantian pada *Dump truck* HDT2472

| HDT2472 | | | |
|-------------------|------------------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| September 9, 2016 | LAMP ASSY | 566-06-6A310 | Rp314.457 |
| | LAMP ASSY | 421-06-23310 | Rp798.366 |
| | VALVE STEERING | 569-40-63302 | Rp55.840.517 |
| | LIMITER ASSY FUEL FLOW | ND095400-0310 | Rp411.405 |
| | LAMP ASSY | 421-06-23350 | Rp712.605 |
| | BACK UP ALARM | 08164-B0000 | Rp1.103.088 |
| | HOSE | 07298-01409 | Rp274.270 |
| | ELBOW | 421-09-12540 | Rp78.510 |
| | ELBOW | 234-60-22672 | Rp405.555 |
| | BATTERY | N200AH | Rp9.430.555 |
| | HOSE | 6245-21-8830 | Rp32.730 |
| | CLIP | 07285-00280 | Rp43.502 |
| | O-RING | 07000-F3048 | Rp13.464 |
| Total | | | Rp69.459.024 |

Tabel 4. 13 Biaya Penggantian pada *Dump truck* HDT2473

| HDT2473 | | | |
|-------------------|----------------|----------------|---------------|
| Tanggal | Komponen | Product Number | Price |
| September 9, 2016 | BACK UP ALARM | 08164-B0000 | Rp1.103.088 |
| | LAMP ASSY | 421-06-23350 | Rp712.605 |
| | LAMP ASSY | 421-06-23310 | Rp798.366 |
| | LAMP ASSY | 23B-06-42460 | Rp314.665 |
| | VALVE STEERING | 569-40-63302 | Rp55.840.517 |
| | HOSE | 569-01-88141 | Rp318.186 |
| | LAMP ASSY | 566-06-6A310 | Rp314.457 |
| | TUBE | 569-43-86410 | Rp2.068.834 |
| | COUPLING | 07332-01200 | Rp801.888 |
| | REGULATOR | 56B-54-14350 | Rp9.989.166 |
| | BATTERY | N200AH | Rp9.430.555 |
| | HOSE | 07298-01409 | Rp274.270 |
| | O-RING | 07000-F3048 | Rp13.464 |
| | TUBE | 569-52-82670 | Rp615.138 |
| | ELBOW | 421-09-12540 | Rp78.510 |
| | SENSOR | 569-06-83410 | Rp940.266 |
| | BEARING | 6245-61-3960 | Rp217.510 |
| | O-RING | 07000-12085 | Rp15.329 |
| | SEAL | 6245-61-3970 | Rp12.367.435 |
| | COUPLING ASSY | 569-01-62720 | Rp8.009.355 |
| | SEAL | 569-01-12912 | Rp138.999 |
| February 8, 2017 | ELBOW | 56B-88-12340 | Rp1.105.574 |
| February 26, 2017 | TURBOCHARGER | 6502-52-5010 | Rp22.658.785 |
| Total | | | Rp128.158.656 |

Tabel 4. 14 Biaya Penggantian pada *Dump truck* HDT2474

| HDT2474 | | | |
|-------------------|--------------------------|----------------|--------------|
| Tanggal | Serial Number | Product Number | Price |
| September 9, 2016 | VALVE STEERING | 569-40-63302 | Rp55.840.517 |
| | BACK UP ALARM | 08164-B0000 | Rp1.103.088 |
| | LAMP ASSY | 421-06-23350 | Rp712.605 |
| | LAMP ASSY | 421-06-23310 | Rp798.366 |
| | BATTERY | N200AH | Rp9.430.555 |
| | LAMP ASSY COMBINATION LH | 56B-06-15630 | Rp705.769 |
| | TUBE | 569-02-81111 | Rp498.409 |
| | REGULATOR | 56B-54-14350 | Rp9.989.166 |
| | KNOB KIT | AS187947 | Rp546.560 |
| | LAMP ASSY | 566-06-6A310 | Rp314.457 |
| October 27, 2016 | SENSOR | 7861-93-8100 | Rp3.757.751 |
| October 28, 2016 | BATTERY N200 | 08000-02220 | Rp2.535.000 |
| October 28, 2016 | SENSOR | 7861-93-8710 | Rp1.781.306 |
| February 11, 2017 | BEARING | 06301-06306 | Rp204.459 |
| April 20, 2017 | BUSHING END ROD | 569-52-41920 | Rp952.281 |
| | PIN | 569-52-81150 | Rp7.465.150 |
| Total | | | Rp96.635.439 |

Tabel 4.5-4.14 merupakan biaya penggantian komponen yang terjadi pada *dump truck* yang harus dikeluarkan oleh *lessor* yang terjadi dari periode Mei 2014

– April 2017. Tabel 4.15 menunjukkan rekap seluruh biaya penggantian komponen yang terjadi pada masing-masing *dump truck* yang dimiliki oleh *lessor* periode Mei 2014 - April 2017.

Tabel 4. 15 Total biaya penggantian *dump truck*

| No. | <i>Dump truck</i> | Total biaya penggantian |
|-----|-------------------|-------------------------|
| 1 | HDT2301 | Rp80.060.669 |
| 2 | HDT2302 | Rp108.350.008 |
| 3 | HDT2306 | Rp89.071.554 |
| 4 | HDT2307 | Rp244.548.456 |
| 5 | HDT2469 | Rp18.079.849 |
| 6 | HDT2470 | Rp49.109.335 |
| 7 | HDT2471 | Rp26.235.332 |
| 8 | HDT2472 | Rp69.459.024 |
| 9 | HDT2473 | Rp128.158.656 |
| 10 | HDT2474 | Rp96.635.439 |

4.3.2 *Biaya Setup (C_s)*

Biaya setup merupakan biaya yang diperlukan oleh sebuah *dump truck* agar dapat beroperasi. Ketika kegiatan *setup* dilakukan, maka kegiatan operasional *dump truck* tidak berjalan. Sehingga *lessor* dalam hal ini mengalami *lost profit* dari hasil penyewaan *dump truck*. Dalam *contractual agreement* biaya penyewaan *dump truck* Caterpillar dan Komatsu nilainya sama yaitu sebesar Rp. 1.082.300,00. Untuk *dump truck* komatsu waktu *setup* yang dibutuhkan adalah 7 jam, sedangkan pada *dump truck* caterpillar waktu *setup* yang dibutuhkan adalah 8 jam. Lamanya waktu *setup* didapat dari data *Daily Condition Unit* yang dimiliki oleh *lessor* dengan nama kegiatan *commissioning*. Sehingga *lost profit* disini dapat dikonversikan sebagai biaya *setup*. Tabel 4.16 menunjukkan biaya setup pada masing-masing *dump truck*.

Tabel 4. 16 Biaya *setup* berdasarkan jenis *dump truck*

| No. | Merek | <i>Dump truck</i> | Waktu Setup (jam) | Biaya Sewa/jam | Biaya Setup |
|-----|-------------|-------------------|-------------------|----------------|--------------|
| 1 | Komatsu | HDT465 | 7 | Rp1.082.300 | Rp 7.576.100 |
| 2 | Caterpillar | OHT773 | 8 | Rp1.082.300 | Rp 8.658.400 |

4.3.3 *Biaya Minimal repair (C_{mi})*

Pada biaya *minimal repair* komponen biaya terdiri dari biaya yang terjadi pada setiap perbaikan serta biaya operator. Dalam menentukan biaya perbaikan, dapat dilakukan konversi dengan menentukan nilai *Mean Time to Repair* (MTTR)

pada masing-masing *dump truck*, untuk selanjutnya dikalikan dengan biaya sewa setiap jamnya pada masing-masing *dump truck*. Subbab 4.6 akan menjelaskan secara detail cara perhitungan nilai MTTR serta nilai MTTR pada masing-masing *dump truck*. Untuk biaya operator sendiri pihak *lessor* membayar sebesar Rp 8.000.000 setiap bulannya, jika dilakukan konversi maka biaya per jam untuk membayar operator adalah sebesar Rp.16.666 dengan asumsi 20 hari kerja selama 1 bulan. Tabel 4.17 menunjukkan biaya *minimal repair* yang terjadi pada masing-masing *dump truck*.

Tabel 4. 17 Biaya *Minimal repair* pada *Dump truck*

| No. | Dump truck | MTTR (a) | Biaya Sewa (b) | Biaya Repair (c=(a*b)) | Biaya Operator (d) | Biaya Minimal repair (c+d) |
|-----|------------|----------|----------------|------------------------|--------------------|----------------------------|
| 1 | 2301 | 1,727 | Rp1.082.300 | Rp 1.868.706 | Rp 16.667 | Rp 1.885.372 |
| 2 | 2302 | 1,825 | | Rp 1.975.720 | Rp 16.667 | Rp 1.992.386 |
| 3 | 2306 | 1,551 | | Rp 1.679.059 | Rp 16.667 | Rp 1.695.726 |
| 4 | 2307 | 1,695 | | Rp 1.834.402 | Rp 16.667 | Rp 1.851.068 |
| 5 | 2469 | 1,761 | | Rp 1.905.934 | Rp 16.667 | Rp 1.922.600 |
| 6 | 2470 | 1,934 | | Rp 2.093.250 | Rp 16.667 | Rp 2.109.916 |
| 7 | 2471 | 1,536 | | Rp 1.662.492 | Rp 16.667 | Rp 1.679.158 |
| 8 | 2472 | 2,072 | | Rp 2.243.045 | Rp 16.667 | Rp 2.259.711 |
| 9 | 2473 | 3,034 | | Rp 3.283.727 | Rp 16.667 | Rp 3.300.393 |
| 10 | 2474 | 1,604 | | Rp 1.735.831 | Rp 16.667 | Rp 1.752.498 |

4.4 Kegiatan *Maintenance* Perusahaan

Aktivitas pemeliharaan dan perawatan yang dilakukan *lessor* dilakukan oleh departemen *Maintenance* yang sudah terlatih. Pada saat ini, kegiatan *Maintenance* yang dilakukan oleh *lessor* berupa kegiatan *Maintenance* rutin berupa *preventive Maintenance* setiap 250, 500, dan 2000 jam. Dalam melakukan kegiatan *Maintenance* yang menjadi acuan *lessor* adalah *Service Meter Unit* (SMU). Namun, tidak jarang pula beberapa komponen pada *dump truck* yang tiba-tiba mengalami kerusakan walaupun sudah dilakukan kegiatan *preventive Maintenance*. Untuk menangani permasalahan tersebut pihak *lessor* biasanya melakukan kanibal komponen agar *Availability* yang diinginkan tetap terjaga.

4.5 *Time to Failure*

Time to Failure merupakan waktu kerusakan yang dimiliki oleh masing-masing *dump truck*. Data kerusakan yang dimiliki masing-masing *dump truck*

didapat dari data historis yang dimiliki perusahaan. Data yang dimiliki oleh perusahaan akan diolah dengan distribusi Weibull 2 parameter pada *software* Weibull ++6, yang nantinya akan didapatkan waktu optimal untuk melakukan *Grouping Maintenance*. Dalam melakukan perhitungan waktu optimal *Grouping Maintenance*, selain parameter biaya, terdapat pula nilai α , *Scale Parameter* dan β , *Shape Parameter* untuk dilakukan perhitungan waktu optimal. Nilai α dan β hanya didapat pada distribusi Weibull 2 parameter. Setelah didapat nilai α dan β selanjutnya dilakukan perhitungan untuk mendapatkan nilai MTTF.

4.5.1 Penentuan Nilai Parameter Time to Faikure pada Dump truck

Dalam penelitian ini untuk mendapatkan nilai parameter yang dimiliki pada masing-masing *dump truck* yang berdistribusi Weibull 2 parameter, pengolahan dilakukan dengan bantuan *software* Weibull ++6. Tabel 4.18 merupakan contoh rekapan data *Time to Failure* untuk tiap-tiap *dump truck* periode Mei 2014 – April 2017. Untuk data *Time to Failure* selengkapnya dapat dilihat pada lampiran 1.

Tabel 4. 18 Contoh Rekap Data *Time to Failure*

| <i>Time to Failure</i> ke- | <i>Dump truck</i> | | | | | | | | | |
|-------------------------------|-------------------|-------|-------|----------------|-------|-------|-------|-------|--------|-------|
| | 2301 | 2302 | 2306 | 2307 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 |
| 1 | 70,9 | 41,6 | 11,2 | 59,4 | 5 | 34,9 | 6,75 | 11 | 66,55 | 8 |
| 2 | 110 | 23,5 | 8,75 | 258,5 | 15,4 | 10,65 | 17,55 | 5,1 | 42,95 | 35,9 |
| 3 | 30,7 | 15,3 | 37,05 | 214 | 22,8 | 7,95 | 14,4 | 24,4 | 23,25 | 43 |
| 4 | 70,475 | 141 | 50,6 | 230,6 | 7 | 5,65 | 32,4 | 11 | 141,75 | 83,65 |
| 5 | 48,05 | 232 | 26,45 | 158,9 | 18,35 | 17 | 11,1 | 7 | 23 | 46,1 |
| 6 | 95,15 | 40,3 | 14,9 | 14 | 111,5 | 16,55 | 14,7 | 27,45 | 51 | 12,4 |
| 7 | 52,65 | 31,6 | 36,25 | 21,35 | 31,9 | 6,05 | 15,85 | 7,6 | 118,75 | 24,15 |
| 8 | 77,75 | 43,9 | 9,7 | 59,1 | 97 | 33,05 | 58,5 | 24,15 | 11,95 | 81,05 |
| 9 | 177,65 | 21 | 16 | 83,4 | 22 | 30 | 19,5 | 11,65 | 21 | 12,65 |
| 10 | 2,25 | 146,9 | 51 | 13,1 | 46,1 | 10,75 | 99,15 | 23,75 | 49,05 | 58,5 |
| ..... | ..... | ..... | ..... | dan seterusnya |  |  |  | ..... | ..... | ..... |

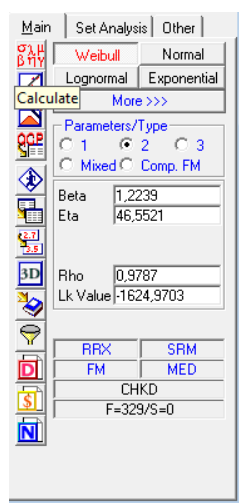
Data *Time to Failure* pada tabel 4.18, selanjutnya akan ditentukan nilai masing-masing parameter dari distribusi yang dimiliki yaitu Weibull 2 parameter. Pada *software* Weibull ++6, diawali dengan membuka *file* baru pada *interface software* tersebut, kemudian pilih opsi “*Time to Failure*”. Selanjutnya memasukkan data *Time to Failure* yang dimiliki oleh masing-masing *dump truck* di area kerja

software Weibull ++6. Gambar 4.1 menunjukkan *interface* untuk melakukan input data pada *software*. Setelah dilakukan input selanjutnya menentukan besar tiap parameter yang dimiliki oleh masing-masing *dump truck*. Untuk mendapatkan nilai parameter yang dimiliki oleh masing-masing *dump truck* dihitung dengan menggunakan fitur *calculate* yang tersedia pada *software*, pada penelitian ini jenis distribusi yang digunakan adalah Weibull 2 parameter. Gambar 4.2 menunjukkan icon serta besar tiap parameter yang dimiliki oleh masing-masing *dump truck*.

Dengan mengikuti serangkaian langkah pada gambar tersebut, didapat nilai *Time to Failure* pada masing-masing *dump truck*. Tabel 4.19 menunjukkan rekapitulasi dari nilai tiap parameter *Time to Failure* yang dimiliki oleh masing-masing *dump truck*.

| D-I | Time Failed | Subset ID |
|-----|-------------|-----------|
| 1 | 0,1 | |
| 2 | 0,1 | |
| 3 | 0,2 | |
| 4 | 0,2 | |
| 5 | 0,2 | |

Gambar 4. 1 Input Data *Time to Failure* pada *Software*



Gambar 4. 2 Perhitungan parameter *Time to Failure* oleh Weibull ++6

Tabel 4. 19 Rekap Parameter *Dump truck* pada *Time to Failure*

| No. | Merek | No. <i>Dump truck</i> | Scale Parameter (α) | Shape Parameter (β) |
|-----|-------------|-----------------------|------------------------------|-----------------------------|
| 1 | Caterpillar | 2301 | 46,5521 | 1,2239 |
| 2 | | 2302 | 47,1044 | 1,1541 |
| 3 | | 2306 | 40,095 | 1,291 |
| 4 | | 2307 | 47,2396 | 1,2909 |

| No. | Merek | No. Dump truck | Scale Parameter (α) | Shape Parameter (β) |
|-----|---------|----------------|------------------------------|-----------------------------|
| 5 | Komatsu | 2469 | 49,1578 | 1,3082 |
| 6 | | 2470 | 45,8693 | 1,1682 |
| 7 | | 2471 | 47,2625 | 1,2332 |
| 8 | | 2472 | 40,4529 | 1,2056 |
| 9 | | 2473 | 49,8794 | 1,2859 |
| 10 | | 2474 | 52,0972 | 1,2401 |

4.5.2 Perhitungan Mean Time to Failure

Setelah didapatkan nilai parameter dari masing-masing *dump truck* menggunakan software Weibull ++6, selanjutnya adalah menentukan nilai *Mean Time to Failure* (MTTF). Berikut merupakan contoh dari perhitungan MTTF pada *dump truck* 2301 berdistribusi Weibull 2 parameter.

Scale Parameter (α) : 46,5521

Shape Parameter (β) : 1,2239

Perhitungan MTTF untuk *dump truck* 2301 berdasarkan persamaan 2.5 adalah:

$$MTTF = \alpha \cdot \Gamma\left(\frac{1}{\beta} + 1\right)$$

$$MTTF = 46,5521 \times \Gamma\left(\frac{1}{1,2239} + 1\right) = 43,574$$

Dari perhitungan di atas, didapatkan bahwa nilai MTTF dari *dump truck* dengan nomor 2301 adalah 43,574 jam. Tabel 4.20 merupakan hasil rekap nilai MTTF seluruh *dump truck* berdasarkan perhitungan dari parameter yang dimiliki oleh masing-masing *dump truck*.

Tabel 4. 20 Rekap MTTF Seluruh *Dump truck*

| No. | No. Dump truck | Scale Parameter (α) | Shape Parameter (β) | MTTF (jam) |
|-----|----------------|------------------------------|-----------------------------|------------|
| 1 | 2301 | 46,5521 | 1,2239 | 43,574 |
| 2 | 2302 | 47,1044 | 1,1541 | 44,783 |
| 3 | 2306 | 40,095 | 1,291 | 37,083 |
| 4 | 2307 | 47,2396 | 1,2909 | 43,692 |
| 5 | 2469 | 49,1578 | 1,3082 | 45,344 |
| 6 | 2470 | 45,8693 | 1,1682 | 43,459 |
| 7 | 2471 | 47,2625 | 1,2332 | 44,158 |
| 8 | 2472 | 40,4529 | 1,2056 | 38,007 |
| 9 | 2473 | 49,8794 | 1,2859 | 46,171 |
| 10 | 2474 | 52,0972 | 1,2401 | 48,612 |

4.6 Time to Repair

Time to Repair merupakan lama waktu perbaikan yang dibutuhkan oleh masing-masing *dump truck*. Data perbaikan yang dimiliki masing-masing *dump truck* didapat dari data historis yang dimiliki perusahaan. Data yang dimiliki oleh perusahaan akan diolah dengan distribusi Weibull 2 parameter pada *software* Weibull ++6, yang nantinya akan digunakan untuk menentukan lamanya waktu perbaikan dengan pertimbangan waktu optimal *Grouping Maintenance*. Selain parameter biaya, terdapat pula nilai α , *Scale Parameter* dan β , *Shape Parameter* untuk dilakukan perhitungan waktu optimal. Nilai α dan β hanya didapat pada distribusi Weibull 2 parameter. Setelah didapat nilai α dan β selanjutnya dilakukan perhitungan untuk mendapatkan nilai MTTR.

4.6.1 Penentuan Nilai Parameter Time to Repair pada Dump truck

Dalam penelitian ini untuk mendapatkan nilai parameter *Time to Repair* yang dimiliki pada masing-masing *dump truck* yang berdistribusi Weibull 2 parameter, pengolahan dilakukan dengan bantuan *software* Weibull ++6. Tabel 4.21 merupakan contoh rekap data *Time to Repair* untuk tiap-tiap *dump truck* periode Mei 2014 – April 2017. Untuk data *Time to Repair* selengkapnya dapat dilihat pada lampiran 2.

Tabel 4. 21 Contoh Rekap Data *Time to Repair*

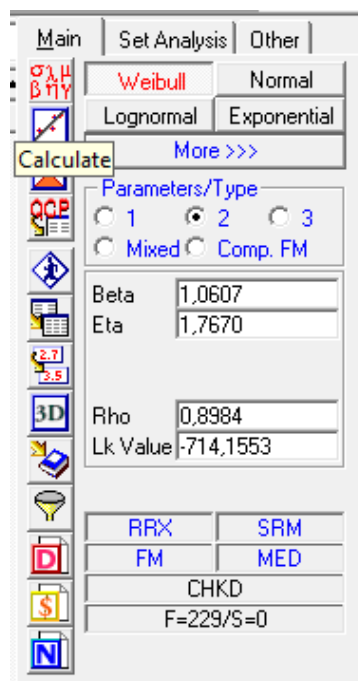
| <i>Time to Repair</i> | <i>Dump truck</i> | | | | | | | | | |
|-----------------------|-------------------|-------|-------|----------------|------|------|--------|-------|-------|-------|
| | 2301 | 2302 | 2306 | 2307 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 |
| 1 | 0,60 | 0,60 | 969,6 | 2,12 | 3 | 3,00 | 0,20 | 1,60 | 13,50 | 0,80 |
| 2 | 4,00 | 7,83 | 1 | 3,00 | 9 | 0,20 | 0,70 | 2,30 | 5,10 | 0,40 |
| 3 | 0,50 | 0,47 | 0,3 | 0,25 | 0,4 | 1,80 | 6,10 | 0,60 | 0,80 | 0,30 |
| 4 | 0,40 | 0,22 | 0,3 | 0,25 | 1,4 | 0,50 | 104,80 | 2,00 | 0,30 | 1,00 |
| 5 | 0,50 | 3,17 | 1,3 | 0,28 | 1,7 | 1,30 | 0,20 | 5,00 | 3,00 | 6,90 |
| 6 | 0,40 | 2,40 | 0,2 | 0,50 | 0,8 | 1,40 | 1,00 | 0,30 | 5,00 | 0,40 |
| 7 | 0,20 | 1,00 | 0,9 | 2,65 | 4,4 | 1,90 | 0,10 | 0,20 | 1,40 | 0,50 |
| 8 | 2,00 | 0,63 | 7,7 | 9,50 | 0,5 | 2,10 | 1,00 | 0,30 | 0,80 | 0,10 |
| 9 | 5,23 | 1,50 | 0,8 | 0,98 | 0,4 | 3,30 | 0,20 | 0,30 | 6,20 | 0,30 |
| 10 | 1,75 | 1,75 | 6,1 | 1,95 | 0,6 | 0,30 | 4,80 | 0,30 | 4,30 | 4,40 |
| ..... | ..... | ..... | ..... | dan seterusnya |  |  |  | ..... | ..... | ..... |

Data *Time to Repair* pada tabel 4.21, selanjutnya akan ditentukan nilai masing-masing parameter dari distribusi yang dimiliki yaitu Weibull 2 parameter.

Pada *software* Weibull ++6, diawali dengan membuka *file* baru pada *interface software* tersebut, kemudian pilih opsi “*Time to Failure*”. Selanjutnya memasukkan data *Time to Failure* yang dimiliki oleh masing-masing *dump truck* di area kerja *software* Weibull ++6. Gambar 4.3 menunjukkan *interface* untuk melakukan input data pada *software*. Setelah dilakukan input selanjutnya menentukan besar tiap parameter yang dimiliki oleh masing-masing *dump truck*. Untuk mendapatkan nilai parameter yang dimiliki oleh masing-masing *dump truck* dihitung dengan menggunakan fitur *calculate* yang tersedia pada *software*, pada penelitian ini jenis distribusi yang digunakan adalah Weibull 2 parameter. Gambar 4.4 menunjukkan icon serta besar tiap parameter yang dimiliki oleh masing-masing *dump truck*.

| D-I | Time Failed | Subset ID |
|-----|-------------|-----------|
| 1 | 0,6 | |
| 2 | 4 | |
| 3 | 0,5 | |
| 4 | 0,4 | |
| 5 | 0,5 | |

Gambar 4. 3 Input Data *Time to Repair* pada *Software*



Gambar 4. 4 Perhitungan parameter *Time to Repair* oleh Weibull ++6

Dengan mengikuti serangkaian langkah pada gambar tersebut, tabel 4.22 merupakan rekap dari nilai tiap parameter *Time to Repair* yang dimiliki oleh masing-masing *dump truck*.

Tabel 4. 22 Rekap Parameter *Dump truck* pada *Time to Repair*

| No. | No. <i>Dump truck</i> | Scale Parameter (α) | Shape Parameter (β) |
|-----|-----------------------|------------------------------|-----------------------------|
| 1 | 2301 | 1,767 | 1,0607 |
| 2 | 2302 | 1,8045 | 0,9739 |
| 3 | 2306 | 1,5908 | 1,0665 |
| 4 | 2307 | 1,7427 | 1,0747 |
| 5 | 2469 | 1,7898 | 1,0412 |
| 6 | 2470 | 2,0059 | 1,1025 |
| 7 | 2471 | 1,5826 | 1,081 |
| 8 | 2472 | 1,9988 | 0,9253 |
| 9 | 2473 | 2,8101 | 0,8606 |
| 10 | 2474 | 1,615 | 1,0169 |

4.6.2 Perhitungan Mean Time to Repair

Setelah didapatkan nilai parameter dari masing-masing *dump truck* menggunakan software Weibull ++6, selanjutnya adalah menentukan nilai *Mean Time to Repair* (MTTR). Berikut merupakan contoh dari perhitungan MTTR pada *dump truck* 2301 berdistribusi Weibull 2 parameter.

Scale Parameter (α) : 1,767

Shape Parameter (β) : 1,0607

Perhitungan MTTF untuk *dump truck* 2301 berdasarkan persamaan 2.5 adalah:

$$MTTR = \alpha \cdot \Gamma\left(\frac{1}{\beta} + 1\right)$$

$$MTTR = 1,767 \times \Gamma\left(\frac{1}{1,0607} + 1\right) = 1,727$$

Dari perhitungan di atas, didapatkan bahwa nilai MTTR dari *dump truck* dengan nomor 2301 adalah 1,727 jam. Tabel 4.23 merupakan hasil rekap nilai MTTR seluruh *dump truck* berdasarkan perhitungan dari parameter yang dimiliki oleh masing-masing *dump truck*.

Tabel 4. 23 Rekap MTTR Seluruh *Dump truck*

| No. | No. <i>Dump truck</i> | Scale Parameter (α) | Shape Parameter (β) | MTTR |
|-----|-----------------------|------------------------------|-----------------------------|-------|
| 1 | 2301 | 1,767 | 1,0607 | 1,727 |
| 2 | 2302 | 1,8045 | 0,9739 | 1,825 |
| 3 | 2306 | 1,5908 | 1,0665 | 1,551 |
| 4 | 2307 | 1,7427 | 1,0747 | 1,695 |
| 5 | 2469 | 1,7898 | 1,0412 | 1,761 |
| 6 | 2470 | 2,0059 | 1,1025 | 1,934 |
| 7 | 2471 | 1,5826 | 1,081 | 1,536 |
| 8 | 2472 | 1,9988 | 0,9253 | 2,072 |
| 9 | 2473 | 2,8101 | 0,8606 | 3,034 |
| 10 | 2474 | 1,615 | 1,0169 | 1,604 |

4.7 Availability

Pada subbab ini akan dilakukan rekapitulasi nilai *Availability* yang dimiliki oleh masing-masing *dump truck* dalam periode Mei 2014 – April 2017. Berdasarkan *contractual agreement* antara *lessee* dan *lessor* nilai *Availability* minimal 85%. Sehingga ketika nilai *Availability* dibawah ketentuan tersebut maka perusahaan akan dikenakan *penalty* berupa *loss profit*, Tabel 4.24 merupakan rekapitulasi nilai *Availability* masing-masing *dump truck*.

Tabel 4. 24 Rekapitulasi *Availability Dump truck*

| Periode | | No. Seri <i>Dump truck</i> | | | | | | | | | |
|---------|-----|----------------------------|-------|-------|-------|-------|-------|-------|------|------|------|
| | | 2301 | 2302 | 2306 | 2307 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 |
| 2014 | May | 97,9% | 97,4% | 97,9% | 99,2% | | | | | | |
| | Jun | 74,0% | 97,2% | 97,5% | 96,7% | | | | | | |
| | Jul | 0,0% | 98,2% | 93,8% | 91,6% | | | | | | |
| | Aug | 100,0% | 69,7% | 97,8% | 95,6% | | | | | | |
| | Sep | 0,0% | 99,6% | 98,8% | 98,3% | | | | | | |
| | Okt | 0,0% | 98,1% | 84,7% | 98,4% | | | | | | |
| | Nov | 94,6% | 92,3% | 93,3% | 97,7% | | | | | | |
| | Des | 98,4% | 96,9% | 98,9% | 97,4% | | | | | | |
| 2015 | Jan | 96,7% | 85,2% | 96,7% | 97,6% | | | | | | |
| | Feb | 96,5% | 38,7% | 82,9% | 52,6% | | | | | | |
| | Mar | 18,8% | 0,0% | 39,0% | 0,0% | | | | | | |
| | Apr | 95,1% | 64,2% | 64,2% | 0,0% | | | | | | |
| | May | 92,0% | 0,0% | 93,6% | 0,0% | | | | | | |
| | Jun | 91,7% | 0,0% | 96,9% | 0,0% | | | | | | |
| | Jul | 96,3% | 0,0% | 97,4% | 0,0% | | | | | | |
| | Aug | 93,7% | 0,0% | 89,3% | 0,0% | | | | | | |
| | Sep | 77,2% | 0,0% | 96,0% | 0,0% | | | | | | |
| | Okt | 97,2% | 60,4% | 94,7% | 71,1% | 97,2% | 99,9% | 95,8% | | | |
| | Nov | 92,7% | 89,1% | 96,9% | 93,7% | 92,7% | 90,7% | 81,5% | | | |
| | Des | 98,3% | 92,4% | 96,3% | 91,3% | 98,3% | 93,7% | 99,0% | | | |
| 2016 | Jan | 98,3% | 95,1% | 98,0% | 90,4% | 98,3% | 98,0% | 90,2% | | | |
| | Feb | 98,3% | 82,6% | 97,9% | 95,6% | 98,3% | 96,5% | 97,0% | | | |
| | Mar | 16,7% | 37,1% | 33,8% | 23,7% | 16,7% | 29,0% | 79,0% | | | |
| | Apr | 50,3% | 0,0% | 42,3% | 46,0% | 50,3% | 50,8% | 47,9% | | | |
| | May | 89,8% | 0,0% | 92,4% | 90,2% | 89,8% | 97,0% | 97,0% | | | |

| Periode | | No. Seri <i>Dump truck</i> | | | | | | | | | |
|--------------|-----|----------------------------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| | | 2301 | 2302 | 2306 | 2307 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 |
| | Jun | 97,5% | 0,0% | 87,3% | 87,1% | 97,5% | 97,9% | 90,8% | | | |
| | Jul | 96,5% | 0,0% | 92,1% | 96,6% | 96,5% | 97,5% | 87,7% | | | |
| | Aug | 94,4% | 0,0% | 93,6% | 95,8% | 94,4% | 98,6% | 68,0% | | | |
| | Sep | 94,9% | 0,0% | 88,7% | 96,1% | 94,9% | 83,1% | 94,7% | | | |
| | Okt | 92,3% | 0,0% | 92,0% | 93,3% | 92,3% | 92,3% | 94,0% | 6,7% | 7,5% | 7,4% |
| | Nov | 94,9% | 0,0% | 15,3% | 91,5% | 92,4% | 95,8% | 96,9% | 82,9% | 89,1% | 97,2% |
| 2017 | Des | 95,1% | 0,0% | 70,3% | 84,7% | 84,4% | 76,5% | 92,7% | 75,0% | 64,1% | 95,9% |
| | Jan | 88,6% | 0,0% | 91,3% | 93,5% | 80,1% | 79,1% | 78,6% | 95,8% | 93,6% | 91,9% |
| | Feb | 92,9% | 50,0% | 80,0% | 90,8% | 78,9% | 96,0% | 91,2% | 94,0% | 78,6% | 93,5% |
| | Mar | 85,1% | 75,7% | 73,1% | 60,6% | 70,6% | 92,9% | 94,7% | 95,0% | 93,1% | 96,6% |
| Availability | | 68,94% | | | | | 84,26% | | | | |

Berdasarkan hasil rekapitulasi pada tabel 4.24 Rata-rata *Availability* yang dimiliki oleh masing-masing merek *dump truck* bernilai kurang dari 85%. Hal ini akan menyebabkan pihak *lessor* mengalami *penalty* berupa *loss profit* dari *lessee*. Sehingga untuk mengantisipasi hal tersebut *lessor* perlu melakukan perbaikan secara sistematis untuk meningkatkan nilai *Availability* pada *dump truck*.

4.8 Validasi Model

Pada jurnal Chang et. Al (2016), diberikan contoh perhitungan dengan nilai masing-masing α , β , C_{ri} , C_s , dan C_{mi} diketahui. Tabel 4.25 merupakan data yang terdapat pada jurnal Chang et. Al (2016).

Tabel 4. 25 Parameter Perhitungan

| | α | β | Replacement Cost | Repair Cost | Setup Cost |
|----|----------|---------|------------------|-------------|------------|
| p1 | 0,3 | 2 | 1160 | 330 | 800 |
| p2 | 0,26 | 2 | 850 | 150 | |
| p3 | 0,15 | 2 | 540 | 160 | |
| p4 | 0,1 | 2 | 1180 | 340 | |
| p5 | 0,06 | 2 | 1470 | 200 | |

Pada tabel 4.26 terdapat *Grouping* dan biaya optimal pada masing-masing *Group* dengan jumlah komponen sebanyak 5 unit.

Tabel 4. 26 Waktu dan Biaya Optimal *Grouping Maintenance*

| k | Component of each <i>Group j</i> | | | | | Replacement time of each <i>Group Tj</i> | | | | | E(TC) |
|---|---|-------------------|-------------------|-------------------|-------------------|--|-------|-------|-------|-------|--------|
| | 1 | 2 | 3 | 4 | 5 | T1 | T2 | T3 | T4 | T5 | |
| 5 | {P ₁ } | {P ₂ } | {P ₃ } | {P ₄ } | {P ₅ } | 8,12 | 12,76 | 19,29 | 24,13 | 56,15 | 1125,1 |
| 4 | {P _i } _{i=1} ² | {P ₃ } | {P ₄ } | {P ₅ } | | 8,40 | 19,29 | 24,13 | 56,15 | | 1053,0 |
| 3 | {P _i } _{i=1} ³ | {P ₄ } | {P ₅ } | | | 8,78 | 24,13 | 56,15 | | | 1007,9 |

| k | Component of each Group j | | | | | Replacement time of each Group Tj | | | | | E(TC) |
|---|---------------------------|-------------------|-----------|---|---|-----------------------------------|-------|-------|----|----|--------|
| | 1 | 2 | 3 | 4 | 5 | T1 | T2 | T3 | T4 | T5 | |
| 3 | $\{P_i\}_{i=1}^2$ | $\{P_i\}_{i=3}^4$ | $\{P_5\}$ | | | 8,40 | 18,97 | 56,15 | | | 1015,6 |
| 2 | $\{P_i\}_{i=1}^3$ | $\{P_i\}_{i=4}^5$ | | | | 8,78 | 28,94 | | | | 1001,4 |
| 2 | $\{P_i\}_{i=1}^4$ | $\{P_5\}$ | | | | 9,8 | 56,15 | | | | 1002,1 |
| 1 | $\{P_i\}_{i=1}^5$ | | | | | 11,23 | | | | | 1068,3 |

Sumber: *Engineering Asset Management* (Chuan-Wen Chiu, 2016)

Dalam melakukan perhitungan waktu dan biaya optimal *Grouping Maintenance*, dilakukan dengan *built-in function* pada software Matlab. Gambar 4.5 - 4.8 merupakan hasil pengolahan dengan *built-in function* pada software Matlab untuk waktu dan biaya optimal *Grouping Maintenance*. Adapun program yang dilakukan *built-in function* adalah nilai ETC dan T_g pada masing-masing *Grouping Maintenance* serta total biaya yang terjadi pada *Grouping Maintenance* tersebut.

Pada gambar 4.5 – 4.8, hasil pengolahan data dengan menggunakan *built-in function* pada Matlab sama dengan nilai waktu dan biaya optimal pada tabel 4.26. Proses *built-in function* pada matlab, mengikuti persamaan 2.10 – 2.13, proses *built-in function* selengkapnya terdapat pada lampiran 5.

```

1 - clear; clc;
2
3 - p1 = [0.30; 2; 1160; 330; 800];
4 - p2 = [0.26; 2; 850; 150; 800];
5 - p3 = [0.15; 2; 540; 160; 800];
6 - p4 = [0.10; 2; 1180; 340; 800];
7 - p5 = [0.06; 2; 1470; 200; 800];
8
9 - x = [p1 p2 p3 p4 p5];
10 - n = 5;
11
12 - auto_tege(n, 2, x);

tg3(1-3): 8.7817.    ETC: 762.9522.
tg3(4-5): 28.9375.  ETC: 238.4450.
ETC3: 1001.3971.

tg4(1-4): 9.8342.    ETC: 921.2713.
tg4(5-5): 56.1496.  ETC: 80.8554.
ETC4: 1002.1267.

```

Gambar 4. 5 *Grouping Maintenance* k=2

```

1 - clear; clc;
2
3 - p1 = [0.30; 2; 1160; 330; 800];
4 - p2 = [0.26; 2; 850; 150; 800];
5 - p3 = [0.15; 2; 540; 160; 800];
6 - p4 = [0.10; 2; 1180; 340; 800];
7 - p5 = [0.06; 2; 1470; 200; 800];
8
9 - x = [p1 p2 p3 p4 p5];
10 - n = 5;
11
12 - auto_tege(n, 3, x);

tg5(1-2): 8.3983.    ETC: 669.1798.
tg5(3-4): 18.9737.  ETC: 265.6313.
tg5(5-5): 56.1496.  ETC: 80.8554.
ETC5: 1015.6665.

tg6(1-3): 8.7817.    ETC: 762.9522.
tg6(4-4): 24.1320.  ETC: 164.0975.
tg6(5-5): 56.1496.  ETC: 80.8554.
ETC6: 1007.9051.

```

Gambar 4. 6 *Grouping Maintenance* k=3

```

1 - clear; clc;
2
3 - p1 = [0.30; 2; 1160; 330; 800];
4 - p2 = [0.26; 2; 850; 150; 800];
5 - p3 = [0.15; 2; 540; 160; 800];
6 - p4 = [0.10; 2; 1180; 340; 800];
7 - p5 = [0.06; 2; 1470; 200; 800];
8
9 - x = [p1 p2 p3 p4 p5];
10 - n = 5;
11
12 - auto_tege(n, 4, x);

tg4(1-2): 8.3983.   ETC: 669.1798.
tg4(3-3): 19.2931. ETC: 138.9100.
tg4(4-4): 24.1320. ETC: 164.0975.
tg4(5-5): 56.1496. ETC: 80.8554.
ETC4: 1053.0428.

```

Gambar 4. 7 *Grouping Maintenance* k=4

```

1 - clear; clc;
2
3 - p1 = [0.30; 2; 1160; 330; 800];
4 - p2 = [0.26; 2; 850; 150; 800];
5 - p3 = [0.15; 2; 540; 160; 800];
6 - p4 = [0.10; 2; 1180; 340; 800];
7 - p5 = [0.06; 2; 1470; 200; 800];
8
9 - x = [p1 p2 p3 p4 p5];
10 - n = 5;
11
12 - auto_tege(n, 5, x);

tgl(1-1): 8.1236.   ETC: 482.5433.
tgl(2-2): 12.7562. ETC: 258.6967.
tgl(3-3): 19.2931. ETC: 138.9100.
tgl(4-4): 24.1320. ETC: 164.0975.
tgl(5-5): 56.1496. ETC: 80.8554.
ETC1: 1125.1030.

```

Gambar 4. 8 *Grouping Maintenance* k=5

Berdasarkan gambar 4.5 – 4.8 algoritma program yang dibuat pada Matlab sudah sesuai dengan waktu, biaya, dan *Grouping Maintenance Policy* optimal yang terdapat pada jurnal Chang et. Al (2016).

4.9 Perhitungan Waktu dan Biaya Optimal *Grouping Maintenance*

Pada subbab ini akan dilakukan perhitungan waktu dan estimasi biaya optimal untuk melakukan *Grouping Maintenance Policy* pada *dump truck* yang dimiliki oleh *lessor*. Perhitungan waktu dan biaya untuk melakukan *Maintenance* pada *dump truck* dibedakan berdasarkan berdasarkan merek *dump truck*, yaitu Komatsu dan Caterpillar.

Untuk *dump truck* merek Caterpillar nomor lambung yang dimiliki adalah HDT 2301, HDT 2302, HDT 2306, HDT 2307. Sedangkan untuk *dump truck* merek Komatsu nomor lambung yang dimiliki adalah HDT 2469, HDT 2470, HDT 2471, HDT 2472, HDT 2473, HDT 2474. Hal ini dilakukan berdasarkan SMU pada masing-masing *dump truck*, SMU yang dimiliki *dump truck* Caterpillar lebih banyak dibandingkan dengan Komatsu.

4.9.1 Perhitungan Waktu dan Biaya Optimal *Grouping Maintenance* Caterpillar

Dalam melakukan perhitungan waktu *Grouping Maintenance*, dapat dilakukan dengan mengikuti persamaan 2.10 dan 2.11, dan untuk perhitungan biaya

optimal *Grouping Maintenance* dapat dilakukan dengan mengikuti persamaan 2.12 dan 2.13. Pada persamaan tersebut, perhitungan biaya dan waktu optimal dipengaruhi oleh beberapa variabel seperti nilai α dan β , biaya setup (C_s), biaya *minimal repair* (C_{mi}), dan biaya penggantian (C_{ri}). Jumlah grup yang dapat terjadi dalam melakukan *Grouping Maintenance* mengikuti jumlah *dump truck* milik *lessor* pada masing-masing merek. Notasi β akan selalu berubah sesuai dengan jumlah *dump truck* yang ada pada satu *Group*. Tabel 4.27 merupakan rekapitulasi dari masing-masing notasi pada perhitungan waktu dan biaya optimal untuk *dump truck* caterpillar.

Tabel 4. 27 Rekapitulasi Notasi Perhitungan Waktu dan Biaya Optimal Caterpillar

| No. | Dump truck | α | C_{ri} | C_s | C_{mi} |
|-----|------------|----------|---------------|-------------|-------------|
| 1 | HDT2301 | 46,5521 | Rp80.060.669 | Rp8.658.400 | Rp1.885.372 |
| 2 | HDT2302 | 47,1044 | Rp108.350.008 | | Rp1.992.386 |
| 3 | HDT2306 | 40,095 | Rp89.071.554 | | Rp1.695.726 |
| 4 | HDT2307 | 47,2396 | Rp244.548.456 | | Rp1.851.068 |

Berdasarkan tabel 4.27 Dapat dilakukan perhitungan waktu dan biaya optimal berdasarkan persamaan 2.10 - 2.13. berikut merupakan contoh-contoh perhitungan jika jumlah *Grouping Maintenance* adalah satu ($k = 1$) dan jumlah *Grouping Maintenance* sama dengan jumlah *dump truck* ($k = n$).

- *Grouping Maintenance* $k = 1$

Tabel 4.28 merupakan rekapitulasi tiap-tiap notasi pada *Grouping Maintenance* dengan jumlah *Group* 1 ($k = 1$).

Tabel 4. 28 Contoh Hasil Perhitungan *Grouping Maintenance* dengan $k = 1$ Caterpillar

| No. | Dump truck | α | β | C_{ri} | C_s | C_{mi} |
|-----|------------|----------|---------|---------------|-------------|-------------|
| 1 | HDT2301 | 46,5521 | 1,2447 | Rp80.060.669 | Rp8.658.400 | Rp1.885.372 |
| 2 | HDT2302 | 47,1044 | | Rp108.350.008 | | Rp1.992.386 |
| 3 | HDT2306 | 40,095 | | Rp89.071.554 | | Rp1.695.726 |
| 4 | HDT2307 | 47,2396 | | Rp244.548.456 | | Rp1.851.068 |

Berdasarkan tabel 4.28, dapat dilakukan perhitungan waktu optimal berdasarkan persamaan 2.10. Nilai β didapatkan dengan mengombinasikan seluruh data kerusakan tiap *dump truck* berdasarkan *group* yang dimiliki, untuk selanjutnya

dilakukan input ke dalam software Weibul ++6 untuk dilakukan pengolahan. Berikut merupakan contoh perhitungan waktu *Grouping* optimal dengan k = 1:

$$T_{g_1}^* = \left[\frac{(\sum_{i=1}^n C_{ri}) + C_s}{(\beta-1) \sum_{i=1}^n C_{mi} \alpha_i^\beta} \right]^{\frac{1}{\beta}}$$

$$T_{g_1}^* = \left[\frac{(Rp80.060.669 + \dots + Rp244.548.456) + Rp8.658.400}{[(1,2447-1) \times (Rp1.885.372 \times 46,5521^{1,2447} + \dots + Rp1.851.068 \times 47,2396^{1,2447})]} \right]^{\frac{1}{1,2447}}$$

$$T_{g_1}^* = 2,1066$$

Berikut merupakan perhitungan biaya *Grouping* optimal berdasarkan persamaan 2.12

$$E[TC(T_{g_1}^*)] = \frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*}$$

$$E[TC(T_{g_1}^*)] = \frac{(Rp1.885.372 \times 2,1066 \times h(2,03093) + \dots + Rp1.851.068 \times 2,1066 \times h(2,1066))}{2,1066}$$

$$E[TC(T_{g_1}^*)] = 1.281.418$$

Dari perhitungan di atas, maka didapatkan jika dilakukan *Grouping Maintenance Policy* dengan k = 1, maka waktu optimal untuk dilakukan *Grouping Maintenance* adalah 2,1066 jam dengan biaya groping *Maintenance* sebesar 1.281.418.

- *Grouping Maintenance* k = n

Tabel 4.29 merupakan rekapitulasi tiap-tiap notasi pada *Grouping Maintenance* dengan jumlah *Group* sesuai dengan jumlah *dump truck* (k = n).

Tabel 4. 29 Contoh Hasil Perhitungan *Grouping Maintenance* dengan k = n Caterpillar

| No. | Dump truck | α | β | Cri | Cs | Cmi |
|-----|------------|----------|---------|---------------|-------------|-------------|
| 1 | HDT2301 | 46,5521 | 1,2239 | Rp80.060.669 | Rp8.658.400 | Rp1.885.372 |
| 2 | HDT2302 | 47,1044 | 1,1541 | Rp108.350.008 | | Rp1.992.386 |
| 3 | HDT2306 | 40,095 | 1,291 | Rp89.071.554 | | Rp1.695.726 |
| 4 | HDT2307 | 47,2396 | 1,2909 | Rp244.548.456 | | Rp1.851.068 |

Berdasarkan tabel 4.29, dapat dilakukan perhitungan waktu optimal berdasarkan persamaan 2.11. Berikut merupakan contoh perhitungan waktu *Grouping* optimal dengan k = n:

$$T_{g_1}^* = \left[\frac{Rp80.060.669 + Rp8.658.400}{(1,2239-1) \times Rp1.885.372 \times 46,5521^{1,2239}} \right]^{\frac{1}{1,2239}} = 1,6972$$

$$T_{g_2}^* = \left[\frac{Rp108.350.008 + Rp8.658.400}{(1,1541-1) \times Rp1.992.386 \times 47,1044^{1,1541}} \right]^{\frac{1}{1,1541}} = 3,055$$

$$T_{g_3}^* = \left[\frac{Rp89.071.554 + Rp8.658.400}{(1,291-1) \times Rp1.695.726 \times 40,095^{1,291}} \right]^{\frac{1}{1,291}} = 1,4996$$

$$T_{g_4}^* = \left[\frac{Rp244.548.456 + Rp8.658.400}{(1,2239-1) \times Rp1.851.068 \times 47,2396^{1,2239}} \right]^{\frac{1}{1,2239}} = 2,4877$$

Berikut merupakan contoh perhitungan biaya *Grouping* optimal berdasarkan persamaan 2.13:

$$E[TC(T_{g_1}^*, T_{g_2}^*, \dots, T_{g_k}^*)] = \sum_{j=1}^k \left(\frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*} \right)$$

$$E[TC(T_{g_1}^*, T_{g_2}^*, T_{g_3}^*, T_{g_4}^*)] = \left(\frac{Rp1.885.372 \times 1,6972 \times h(1,6972)}{1,6972} \right) + \dots + \left(\frac{Rp1.851.068 \times 2,4877 \times h(2,4877)}{2,4877} \right)$$

$$E[TC(T_{g_1}^*, T_{g_2}^*, T_{g_3}^*, T_{g_4}^*)] = 1.234.928$$

Tabel 4.30 merupakan hasil rekap nilai β , waktu dan biaya optimal *Grouping Maintenance* pada seluruh *dump truck* caterpillar dengan seluruh kemungkinan *Grouping* melalui proses perhitungan.

Tabel 4. 30 Rekapitulasi Waktu dan Biaya Semua Kemungkinan *Grouping Maintenance* Caterpillar

| k | No | <i>Grouping Maintenance</i> | β | tg | ETC (tg) | ETC (tg1) |
|---|----|-------------------------------|---------|--------|-------------|---------------------|
| 1 | 1 | g1 = [2301, 2302, 2306, 2307] | 1,2447 | 2,1066 | Rp1.281.418 | Rp1.281.418 |
| k | No | <i>Grouping Maintenance</i> | β | tg | ETC (tg) | ETC (tg1, tg2) |
| 2 | 1 | g1 = [2301] | 1,2239 | 1,697 | Rp285.741 | Rp1.263.516 |
| | | g2 = [2302, 2306, 2307] | 1,2462 | 2,333 | Rp977.776 | |
| | 2 | g1 = [2301, 2302] | 1,193 | 2,282 | Rp533.801 | Rp1.280.298 |
| | | g2 = [2306, 2307] | 1,2923 | 2,027 | Rp746.497 | |
| | 3 | g1 = [2301, 2302, 2306] | 1,2287 | 1,829 | Rp840.579 | Rp1.292.245 |
| | | g2 = [2307] | 1,2909 | 2,488 | Rp451.666 | |
| k | No | <i>Grouping Maintenance</i> | β | tg | ETC (tg) | ETC (tg1, tg2, tg3) |
| 3 | 1 | g1 = [2301] | 1,2239 | 1,697 | Rp285.741 | Rp1.271.740 |
| | | g2 = [2302] | 1,1541 | 3,659 | Rp239.502 | |
| | | g3 = [2306, 2307] | 1,2923 | 2,027 | Rp746.497 | |
| | 2 | g1 = [2301, 2302] | 1,1930 | 2,282 | Rp533.801 | Rp1.274.589 |
| | | g2 = [2306] | 1,2910 | 1,500 | Rp289.122 | |
| | | g3 = [2307] | 1,2909 | 2,488 | Rp451.666 | |
| | 3 | g1 = [2301] | 1,2239 | 1,697 | Rp285.741 | Rp1.281.911 |
| | | g2 = [2302, 2306] | 1,2241 | 2,067 | Rp544.504 | |
| | | g3 = [2307] | 1,2909 | 2,488 | Rp451.666 | |

| k | No | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1, tg2, tg3, tg4) |
|---|----|----------------------|---------|-------|-----------|--------------------------|
| 4 | 1 | g1 = [2301] | 1,2239 | 1,697 | Rp368.274 | Rp1.234.928 |
| | | g2 = [2302] | 1,1541 | 3,056 | Rp530.812 | |
| | | g3 = [2306] | 1,291 | 1,500 | Rp335.842 | |
| | | g4 = [2307] | 1,2909 | 2,488 | Rp870.426 | |

Berdasarkan tabel 4.30, maka didapatkan jika dilakukan *Grouping Maintenance Policy* dengan $k = 4$, maka waktu optimal untuk masing-masing *dump truck* melakukan *Maintenance* adalah 1,6972 jam, 3,055 jam, 1,4996 jam, dan 2,4877 jam, secara berurutan dengan biaya total *Grouping Maintenance* sebesar Rp1.234.928.

4.9.2 Perhitungan Waktu dan Biaya Optimal Grouping Maintenance Komatsu

Untuk melakukan perhitungan waktu *Grouping Maintenance* mengikuti persamaan 2.10 dan 2.11, sedangkan untuk perhitungan biaya optimal *Grouping Maintenance* dapat dilakukan dengan mengikuti persamaan 2.12 dan 2.13. Pada persamaan tersebut, perhitungan biaya dan waktu optimal dipengaruhi oleh beberapa variabel seperti nilai α dan β , biaya setup (C_s), biaya *minimal repair* (C_{mi}), dan biaya penggantian (C_{ri}). Jumlah grup yang dapat terjadi dalam melakukan *Grouping Maintenance* mengikuti jumlah *dump truck* milik *lessor* pada masing-masing merek. Notasi β akan selalu berubah sesuai dengan jumlah *dump truck* yang ada pada satu *Group*. Tabel 4.31 merupakan rekapitulasi dari masing-masing notasi pada perhitungan waktu dan biaya optimal untuk *dump truck* Komatsu.

Tabel 4. 31 Rekapitulasi Notasi Perhitungan Waktu dan Biaya Optimal Komatsu

| No. | Dump truck | α | C_{ri} | C_s | C_{mi} |
|-----|------------|----------|---------------|-------------|--------------|
| 1 | HDT2469 | 49,1578 | Rp18.079.849 | Rp7.576.100 | Rp 1.922.600 |
| 2 | HDT2470 | 45,8693 | Rp49.109.335 | | Rp 2.109.916 |
| 3 | HDT2471 | 47,2625 | Rp26.235.332 | | Rp 1.679.158 |
| 4 | HDT2472 | 40,4529 | Rp69.459.024 | | Rp 2.259.711 |
| 5 | HDT2473 | 49,8794 | Rp128.158.656 | | Rp 3.300.393 |
| 6 | HDT2474 | 52,0972 | Rp96.635.439 | | Rp 1.752.498 |

Berdasarkan tabel 4.31 Dapat dilakukan perhitungan waktu dan biaya optimal berdasarkan persamaan 2.10-2.13. Berikut merupakan contoh-contoh

perhitungan dengan jumlah *Grouping Maintenance* adalah satu ($k = 1$) dan jumlah *Grouping Maintenance* sama dengan jumlah *dump truck* ($k = n$).

- *Grouping Maintenance* $k = 1$

Tabel 4.32 merupakan rekapitulasi tiap-tiap notasi pada *Grouping Maintenance* dengan jumlah *Group* 1 ($k = 1$).

Tabel 4. 32 Contoh Hasil Perhitungan *Grouping Maintenance* dengan $k = 1$ Komatsu

| No. | Dump truck | α | β | Cri | Cs | Cmi |
|-----|------------|----------|---------|---------------|-------------|-------------|
| 1 | HDT2469 | 49,1578 | 1,2485 | Rp18.079.849 | Rp7.576.100 | Rp1.922.600 |
| 2 | HDT2470 | 45,8693 | | Rp49.109.335 | | Rp2.109.916 |
| 3 | HDT2471 | 47,2625 | | Rp26.235.332 | | Rp1.679.158 |
| 4 | HDT2472 | 40,4529 | | Rp69.459.024 | | Rp2.259.711 |
| 5 | HDT2473 | 49,8794 | | Rp128.158.656 | | Rp3.300.393 |
| 6 | HDT2474 | 52,0972 | | Rp96.635.439 | | Rp1.752.498 |

Berdasarkan tabel 4.32, dapat dilakukan perhitungan waktu optimal berdasarkan persamaan 2.10. Nilai β didapatkan dengan mengombinasikan seluruh data kerusakan tiap *dump truck* berdasarkan *group* yang dimiliki, untuk selanjutnya dilakukan input ke dalam software Weibul ++6 untuk dilakukan pengolahan. Berikut merupakan contoh perhitungan waktu *Grouping* optimal dengan $k = 1$:

$$T_{g_1}^* = \left[\frac{(\sum_{i=1}^n C_{ri}) + C_s}{(\beta-1) \sum_{i=1}^n C_{mi} \alpha_i^\beta} \right]^{\frac{1}{\beta}}$$

$$T_{g_1}^* = \left[\frac{(Rp18.079.849 + \dots + Rp96.635.439) + Rp7.576.100}{(1,2485-1) \times (Rp1.922.600 \times 49,1578^{1,2485} + \dots + Rp1.752.498 \times 52,0972^{1,2485})} \right]^{\frac{1}{1,2485}}$$

$$T_{g_1}^* = 0,988$$

Berikut merupakan contoh perhitungan biaya *Grouping* optimal berdasarkan persamaan 2.12

$$E[TC(T_{g_1}^*)] = \frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*}$$

$$E[TC(T_{g_1}^*)] = \frac{(Rp1.922.600 \times 0,988 \times h(0,988)) + \dots + Rp1.752.498 \times 0,988 \times h(0,988)}{0,988}$$

$$E[TC(T_{g_1}^*)] = 2.009.351$$

Dari perhitungan di atas, maka didapatkan jika dilakukan *Grouping Maintenance Policy* dengan $k = 1$, maka waktu optimal untuk dilakukan *Grouping Maintenance* adalah 0,988 jam dengan biaya *Grouping Maintenance* sebesar 2.009.351.

- *Grouping Maintenance* $k = n$

Tabel 4.33 merupakan rekapitulasi tiap-tiap notasi pada *Grouping Maintenance* dengan jumlah *Group* sesuai dengan jumlah *dump truck* ($k = n$).

Tabel 4. 33 Contoh Hasil Perhitungan *Grouping Maintenance* dengan $k = n$ Komatsu

| No. | Dump truck | α | β | Cri | Cs | Cmi |
|-----|------------|----------|---------|---------------|-------------|-------------|
| 1 | HDT2469 | 49,1578 | 1,3082 | Rp18.079.849 | Rp7.576.100 | Rp1.922.600 |
| 2 | HDT2470 | 45,8693 | 1,1682 | Rp49.109.335 | | Rp2.109.916 |
| 3 | HDT2471 | 47,2625 | 1,2332 | Rp26.235.332 | | Rp1.679.158 |
| 4 | HDT2472 | 40,4529 | 1,2056 | Rp69.459.024 | | Rp2.259.711 |
| 5 | HDT2473 | 49,8794 | 1,2859 | Rp128.158.656 | | Rp3.300.393 |
| 6 | HDT2474 | 52,0972 | 1,2401 | Rp96.635.439 | | Rp1.752.498 |

Berdasarkan tabel 4.33, dapat dilakukan perhitungan waktu optimal berdasarkan persamaan 2.11. Berikut merupakan contoh perhitungan waktu *Grouping* optimal dengan $k = n$:

$$T_{g_1}^* = \left[\frac{Rp18.079.849 + Rp7.576.100}{(1,3082-1) \times Rp1.922.600 \times 49,1578^{1,3082}} \right]^{\frac{1}{1,3082}} = 0,3625$$

$$T_{g_2}^* = \left[\frac{Rp49.109.335 + Rp7.576.100}{(1,1682-1) \times Rp2.109.916 \times 45,8693^{1,1682}} \right]^{\frac{1}{1,1682}} = 1,677$$

$$T_{g_3}^* = \left[\frac{Rp26.235.332 + Rp7.576.100}{(1,2332-1) \times Rp1.679.158 \times 47,2625^{1,2332}} \right]^{\frac{1}{1,2332}} = 0,7826$$

$$T_{g_4}^* = \left[\frac{Rp69.459.024 + Rp7.576.100}{(1,2056-1) \times Rp2.259.711 \times 40,4529^{1,2056}} \right]^{\frac{1}{1,2056}} = 1,7144$$

$$T_{g_5}^* = \left[\frac{Rp128.158.656 + Rp7.576.100}{(1,2859-1) \times Rp3.300.393 \times 49,8794^{1,2859}} \right]^{\frac{1}{1,2859}} = 1,6246$$

$$T_{g_6}^* = \left[\frac{Rp96.635.439 + Rp7.576.100}{(1,2401-1) \times Rp1.752.498 \times 52,0972^{1,2401}} \right]^{\frac{1}{1,2401}} = 1,6351$$

Berikut merupakan contoh perhitungan biaya *Grouping* optimal berdasarkan persamaan 2.13:

$$E[TC(T_{g_1}^*, T_{g_2}^*, \dots, T_{g_k}^*)] = \sum_{j=1}^k \left(\frac{\sum_{i \in g_j} C_{mi} T_{g_j}^* h_i(T_{g_j}^*)}{T_{g_j}^*} \right)$$

$$E[TC(T_{g_1}^*, T_{g_2}^*, \dots, T_{g_6}^*)] = \left(\frac{Rp1.922.600 \times 0,3625 \times h(0,3625)}{0,3625} \right) + \dots + \left(\frac{Rp1.752.498 \times 1,6351 \times h(1,6351)}{1,6351} \right)$$

$$E[TC(T_{g_1}^*, T_{g_2}^*, \dots, T_{g_6}^*)] = 1.845.058$$

Tabel 4.34 merupakan hasil rekap nilai β , waktu dan biaya optimal *Grouping Maintenance* pada seluruh *dump truck* komatsu dengan seluruh kemungkinan *Grouping* melalui proses perhitungan. Untuk waktu dan biaya optimal *Grouping Maintenance dump truck* komatsu selengkapnya dapat dilihat pada lampiran 3.

Tabel 4. 34 Rekapitulasi Waktu dan Biaya Semua Kemungkinan *Grouping Maintenance* Komatsu

| k | No | Group Maintenance | β | tg | ETC (tg) | ETC (tg1) |
|-------|----------------|---|---------|--------|-------------|------------------------------|
| 1 | 1 | g1 = [2469, 2470, 2471, 2472, 2473, 2474] | 1,2485 | 0,988 | Rp2.009.351 | Rp2.009.351 |
| k | No | Group Maintenance | β | tg | ETC (tg) | ETC(tg1,tg2) |
| 2 | 1 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.925.685 |
| | | g2 = [2470, 2471, 2472, 2473, 2474] | 1,2273 | 1,2530 | Rp1.625.290 | |
| | 2 | g1 = [2469, 2470] | 1,2390 | 0,7064 | Rp548.721 | Rp2.009.105 |
| | | g2 = [2471, 2472, 2473, 2474] | 1,2530 | 1,1126 | Rp1.460.384 | |
| | 3 | g1 = [2469, 2470, 2471] | 1,2426 | 0,6658 | Rp777.048 | Rp1.996.489 |
| | | g2 = [2472, 2473, 2474] | 1,2531 | 1,2254 | Rp1.219.441 | |
| | 4 | g1 = [2469, 2470, 2471, 2472] | 1,2399 | 0,8227 | Rp1.070.928 | Rp2.058.449 |
| | | g2 = [2473, 2474] | 1,2760 | 1,0879 | Rp987.522 | |
| | 5 | g1 = [2469, 2470, 2471, 2472, 2473] | 1,2475 | 0,9058 | Rp1.661.685 | Rp1.990.849 |
| | | g2 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| ..... | dan seterusnya |  | ..... |  |  |  |
| k | | Group Maintenance | β | tg | ETC (tg) | ETC(tg1,tg2,tg3,tg4,tg5,tg6) |
| 6 | 1 | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp1.845.058 |
| | 2 | g2 = [2470] | 1,1682 | 1,677 | Rp234.721 | |
| | 3 | g3 = [2471] | 1,2332 | 0,786 | Rp227.399 | |
| | 4 | g4 = [2472] | 1,2056 | 1,714 | Rp263.471 | |
| | 5 | g5 = [2373] | 1,2859 | 1,625 | Rp489.908 | |
| | 6 | g6 = [2474] | 1,2401 | 1,635 | Rp329.165 | |

Berdasarkan Tabel 4.34, maka didapatkan jika dilakukan *Grouping Maintenance Policy* dengan $k = 6$, maka waktu optimal untuk masing-masing *dump truck* melakukan *Maintenance* adalah 0,3625 jam, 1,677 jam, 0,7826 jam, 1,7144

jam, 1,6246 jam, dan 1,6351 jam, secara berurutan dengan biaya total *Grouping Maintenance* sebesar 1.845.058.

4.10 Kalender *Grouping Maintenance* dalam Periode 1 Bulan

Pada subbab sebelumnya, telah dilakukan perhitungan interval *grouping Maintenance Policy* untuk tiap-tiap *dump truck*. Penentuan interval untuk masing-masing *dump truck* dilakukan dengan memilih biaya optimal di tiap kemungkinan *grouping Maintenance*. Sehingga pada subbab ini akan digabungkan hasil interval waktu *grouping Maintenance* dalam bentuk kalender pemeliharaan dalam periode 1 bulan. Dalam kalender pemeliharaan ini akan ditampilkan waktu-waktu dimana *dump truck* harus melakukan pemeliharaan. Warna kuning merupakan waktu untuk *dump truck* melakukan *Maintenance*. Pada tabel 4.35 akan ditampilkan contoh kalender pada hari pertama, kalender selengkapnya dapat dilihat di lampiran 6.

Tabel 4. 35 Kalender Pemeliharaan *Dump truck*

| Hari ke- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4.11 *Availability Grouping Maintenance Policy Perbaikan*

Pada subbbab ini akan dilakukan perhitungan *Grouping Maintenance Policy* pada *dump truck* di masing-masing merek yang dimiliki *lessor*.

4.11.1 *Availability Grouping Maintenance Policy Perbaikan Caterpillar*

Setelah didapat waktu dan biaya optimal *grouping Maintenance*, selanjutnya dapat diketahui nilai *Availability Grouping Maintenance Policy dump truck* Caterpillar. Nilai *Availability* didapat dari melakukan perhitungan persamaan 2.14, berikut merupakan rumus menentukan *Availability*:

$$Availability = \frac{MTTF}{MTTF + MTTR}$$

Sedangkan untuk nilai *Mean Time to Failure* (MTTF) dan *Mean Time to Repair* (MTTR), perhitungan dapat dilakukan dengan mengikuti persamaan 2.5. Berikut merupakan rumus untuk menentukan nilai MTTF dan MTTR:

$$MTTF = \alpha \times \Gamma \left(\frac{1}{\beta} + 1 \right)$$

Berikut merupakan contoh perhitungan *Availability* pada *dump truck* caterpillar dengan $k=1$.

Time to Failure

Scale Parameter (α) = 45,029

Shape Parameter (β) = 1,245

Mean Time to Failure = $45,029 \times \Gamma \left(\frac{1}{1,245} + 1 \right)$
= 41,980

Time to Repair

Scale Parameter (α) = 1,710

Shape Parameter (β) = 1,055

$$\begin{aligned} \text{Mean Time to Failure} &= 1,710 \times \Gamma\left(\frac{1}{1,055} + 1\right) \\ &= 1,674 \end{aligned}$$

$$\begin{aligned} \text{Availability} &= \frac{\text{MTTF}}{\text{MTTF} + \text{MTTR}} \\ &= \frac{41,980}{41,980 + 1,674} \\ &= 96,165\% \end{aligned}$$

Dari perhitungan di atas, dapat diketahui nilai masing-masing *Availability Grouping Maintenance* pada *dump truck* caterpillar. Tabel 4.36 merupakan rekapitulasi *Availability* di tiap kemungkinan *Grouping Maintenance Policy* pada *dump truck* Caterpillar.

Tabel 4. 36 Rekapitulasi *Availability* Semua Kemungkinan *Grouping Maintenance* Caterpillar

| k | No. | Grouping Maintenance | TTF | | TTR | | MTTF | MTTR | Availability | Availability Rata-rata |
|---|-----|-------------------------------|----------|---------|----------|---------|--------|-------|--------------|------------------------|
| | | | α | β | α | β | | | | |
| 1 | 1 | g1 = [2301, 2302, 2306, 2307] | 45,029 | 1,245 | 1,710 | 1,055 | 41,980 | 1,674 | 96,165% | 96,165% |
| 2 | 1 | g1 = [2301] | 46,552 | 1,224 | 1,767 | 1,061 | 43,574 | 1,727 | 96,189% | 96,165% |
| | | g2 = [2302, 2306, 2307] | 44,624 | 1,246 | 1,702 | 1,051 | 41,591 | 1,669 | 96,142% | |
| | 2 | g1 = [2301, 2302] | 46,771 | 1,193 | 1,788 | 1,011 | 44,063 | 1,780 | 96,117% | 96,115% |
| | | g2 = [2306, 2307] | 43,477 | 1,292 | 1,672 | 1,075 | 40,203 | 1,626 | 96,112% | |
| | 3 | g1 = [2301, 2302, 2306] | 44,290 | 1,229 | 1,693 | 1,040 | 41,417 | 1,667 | 96,131% | 96,198% |
| | | g2 = [2307] | 47,240 | 1,291 | 1,743 | 1,075 | 43,692 | 1,695 | 96,266% | |
| 3 | 1 | g1 = [2301] | 46,552 | 1,224 | 1,767 | 1,061 | 43,574 | 1,727 | 96,189% | 96,128% |
| | | g2 = [2302] | 47,104 | 1,154 | 1,805 | 0,974 | 44,783 | 1,825 | 96,083% | |
| | | g3 = [2306, 2307] | 43,477 | 1,292 | 1,672 | 1,075 | 40,203 | 1,626 | 96,112% | |
| | 2 | g1 = [2301, 2302] | 46,771 | 1,193 | 1,788 | 1,011 | 44,063 | 1,780 | 96,117% | 96,122% |
| | | g2 = [2306] | 40,095 | 1,291 | 1,591 | 1,067 | 37,083 | 1,551 | 95,984% | |
| | | g3 = [2307] | 47,240 | 1,291 | 1,743 | 1,075 | 43,692 | 1,695 | 96,266% | |
| | 3 | g1 = [2301] | 46,552 | 1,224 | 1,767 | 1,061 | 43,574 | 1,727 | 96,189% | 96,179% |
| | | g2 = [2302, 2306] | 43,367 | 1,224 | 1,675 | 1,030 | 40,591 | 1,655 | 96,083% | |
| | | g3 = [2307] | 47,240 | 1,291 | 1,743 | 1,075 | 43,692 | 1,695 | 96,266% | |
| 4 | 1 | g1 = [2301] | 46,552 | 1,224 | 1,767 | 1,061 | 43,574 | 1,727 | 96,189% | 96,131% |
| | 2 | g2 = [2302] | 47,104 | 1,154 | 1,805 | 0,974 | 44,783 | 1,825 | 96,083% | |
| | 3 | g3 = [2306] | 40,095 | 1,291 | 1,591 | 1,067 | 37,083 | 1,551 | 95,984% | |
| | 4 | g4 = [2307] | 47,240 | 1,291 | 1,743 | 1,075 | 43,692 | 1,695 | 96,266% | |

Berdasarkan tabel 4.36, didapatkan nilai *Availability Grouping Maintenance Policy* optimal pada *dump truck* merek Caterpillar adalah sebesar 96,131%.

4.11.2 *Availability Grouping Maintenance Policy Perbaikan Komatsu*

Pada subbab ini, perhitungan *Availability* pada *dump truck* Komatsu sama seperti subbab 4.9.1.1. Pada subbab tersebut dapat diketahui nilai masing-masing *Availability Grouping Maintenance* pada *dump truck* Komatsu. Tabel 4.37 merupakan rekapitulasi *Availability* di tiap kemungkinan *Grouping Maintenance Policy* untuk *dump truck* merek Komatsu. Nilai *Availability* Komatsu selengkapnya dapat dilihat pada lampiran 4.

Tabel 4. 37 Rekapitulasi *Availability* Semua Kemungkinan *Grouping Maintenance* Komatsu

| tabel 4. 57 Rekapitulasi <i>Availability</i> Sekolah Kesehatankinan <i>Grouping Maintenance</i> Komatsu | | | | | | | | | | |
|---|----|---|----------|---------|----------|---------|--------|-------|---------------------|-------------------------------|
| k | No | <i>Grouping Maintenance</i> | TTF | | TTR | | MTTF | MTTR | <i>Availability</i> | <i>Availability Rata-rata</i> |
| | | | α | β | α | β | | | | |
| 1 | 1 | g1 = [2469, 2470, 2471, 2472, 2473, 2474] | 47,216 | 1,249 | 1,857 | 1,017 | 43,988 | 1,844 | 95,9761% | 95,9761% |
| 2 | 1 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 96,0665% |
| | | g2 = [2470, 2471, 2472, 2473, 2474] | 46,595 | 1,227 | 1,881 | 1,005 | 43,585 | 1,877 | 95,871% | |
| | 2 | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,9750% |
| | | g2 = [2471, 2472, 2473, 2474] | 47,016 | 1,253 | 1,825 | 0,998 | 43,766 | 1,827 | 95,993% | |
| | 3 | g1 = [2469, 2470, 2471] | 47,439 | 1,243 | 1,792 | 1,042 | 44,244 | 1,762 | 96,169% | 95,7582% |
| | | g2 = [2472, 2473, 2474] | 46,674 | 1,253 | 2,061 | 0,940 | 43,447 | 2,120 | 95,347% | |
| | 4 | g1 = [2469, 2470, 2471, 2472] | 46,506 | 1,240 | 1,818 | 1,027 | 43,396 | 1,798 | 96,021% | 95,7937% |
| | | g2 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | 5 | g1 = [2469, 2470, 2471, 2472, 2473] | 46,767 | 1,248 | 1,878 | 1,014 | 43,578 | 1,867 | 95,892% | 96,3489% |
| | | g2 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| dan seterusnya | | | | | | | | | | |
| 6 | 1 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,6847% |
| | 2 | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | 3 | g2 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | 4 | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | 5 | g4 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | 6 | g5 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |

Berdasarkan tabel 4.37, didapatkan nilai *Availability* untuk tiap *Grouping Maintenance Policy* pada *dump truck* merek Komatsu. Maka besar *availability* berdasarkan biaya optimal pada *dump truck* Komatsu adalah sebesar 95,6847% dengan jumlah *group* sebanyak 4.

BAB 5

ANALISIS DAN INTERPRETASI DATA

Pada bab ini akan dijelaskan mengenai analisis dan interpretasi data yang sudah dikumpulkan dan diolah pada bab sebelumnya. Pada bab ini akan dilakukan analisis perhitungan *Mean Time to Failure*, analisis perhitungan *Mean Time to Repair*, analisis perhitungan waktu dan biaya optimal, dan analisis perhitungan *availability grouping Maintenance*.

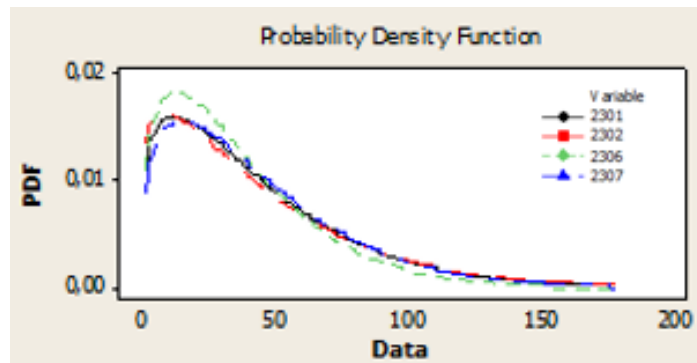
5.1 Analisis Perhitungan *Mean Time to Failure* (MTTF)

Pada subbab ini akan dilakukan Analisa perhitungan MTTF terhadap 2 merek *dump truck* yaitu Caterpillar dan Komatsu.

5.1.1 Analisis Perhitungan MTTF Caterpillar

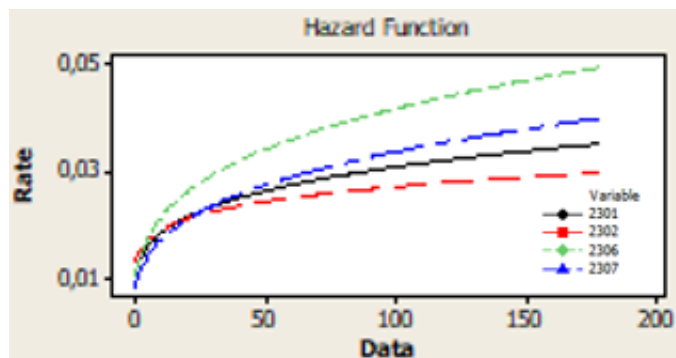
Berdasarkan tabel 4.20, *dump truck* Caterpillar nilai MTTF paling rendah dimiliki oleh *dump truck* HDT2306 yaitu sebesar 37,083 jam. Rendahnya nilai MTTF ini seperti yang terdapat pada lampiran 1, HDT 2306 seringkali mengalami *breakdown*. Hal ini berdampak pada nilai *Scale Parameter* (α) dan *Shape Parameter* (β). Berdasarkan lampiran 1 kerusakan HDT2306 jumlahnya paling banyak, hal ini berakibat pada semakin kecil interval kerusakan yang terjadi pada *dump truck* HDT2306, semakin kecil interval kerusakan maka akan menghasilkan kemungkinan deviasi yang kecil pada data-data yang dimiliki oleh *dump truck* HDT2306. Pada HDT2306 nilai α sebesar 40,095 dan nilai β sebesar 1,291.

Nilai α menunjukkan deviasi yang dimiliki oleh data kerusakan HDT2306, semakin besar nilai α maka semakin landai grafik yang dimiliki oleh data tersebut. Gambar 5.1 merupakan plot grafik interval kerusakan dengan software Minitab pada *dump truck* Caterpillar, pada grafik tersebut garis HDT2306 memiliki nilai PDF paling tinggi, ini dipengaruhi oleh nilai α yang deviasinya berbeda cukup signifikan dibanding nilai α yang dimiliki oleh *dump truck* Caterpillar lainnya.



Gambar 5. 1 Plot Grafik MTTF Caterpillar

Nilai β menunjukkan *Shape Parameter* yang dimiliki oleh masing-masing *dump truck*, semakin besar nilai β maka *density* dan laju kerusakan yang dimiliki oleh data tersebut makin besar. Pada gambar 5.2 menunjukkan *dump truck* HDT2306 memiliki laju kerusakan lebih tinggi dibanding *dump truck* Caterpillar lain. Hal ini dikarenakan nilai β yang dimiliki oleh HDT2306 paling tinggi dibanding yang lain.



Gambar 5. 2 Grafik *Failure Rate* pada MTTF Caterpillar

Rendahnya nilai MTTF yang dimiliki oleh disebabkan nilai α yang paling rendah dan nilai β yang paling tinggi dibanding *dump truck* merek Caterpillar yang lain. Hal ini sejalan pada gambar 5.1 *skewness* yang dimiliki oleh HDT2306 lebih terlihat serta nilai PDF yang dihasilkan lebih tinggi dibandingkan dengan *dump truck* Caterpillar lainnya.

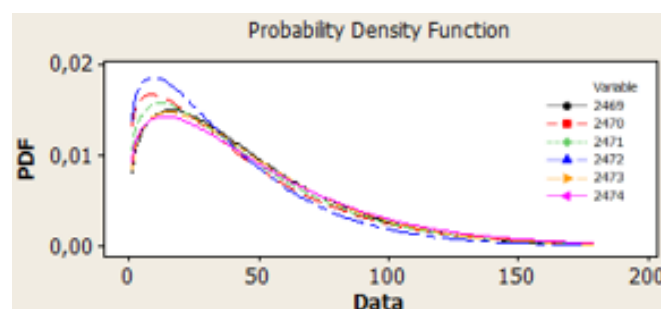
Pada nilai MTTF *dump truck* merek Caterpillar lain, nilai terbesar dimiliki oleh HDT2302 sebesar 44,783 jam. Pada HDT2302 nilai α dan nilai β yang dimiliki tidak se-superlatif seperti HDT2306. Pada tabel 4.20 ditunjukkan perbedaan nilai

nilai α HDT2302 dengan nilai α HDT2307 tidak terlalu signifikan, HDT2307 dijadikan sebagai komparasi karena nilai α yang dimiliki HDT2307 paling tinggi dibandingkan yang lain, HDT2307 memiliki nilai MTTF sebesar 43,692 jam. Hal ini dikarenakan nilai β yang dimiliki oleh HDT2307 lebih besar dibanding HDT2302. Dalam melakukan perhitungan MTTF selain nilai α , nilai β juga memiliki pengaruh terhadap hasil akhir MTTF. Nilai β pada perhitungan MTTF menjadi denominator, sehingga ketika nilai α yang dimiliki kedua data tidak terlalu signifikan namun nilai β berbeda cukup signifikan akan berdampak pada hasil akhir MTTF.

5.1.2 Analisa Perhitungan MTTF Komatsu

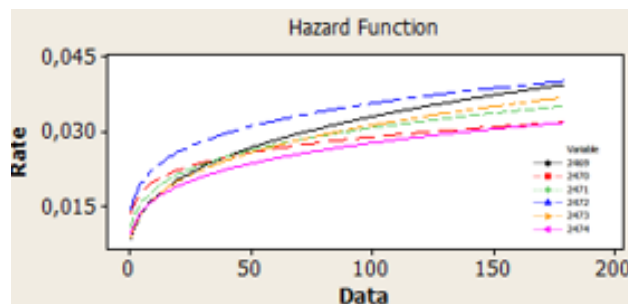
Berdasarkan tabel 4.20, *dump truck* Komatsu nilai MTTF paling rendah dimiliki oleh *dump truck* HDT2472 yaitu sebesar 38,007 jam. Rendahnya nilai MTTF ini dikarenakan oleh interval waktu *breakdown* yang besarnya tidak terlalu signifikan, Hal ini berdampak khususnya pada nilai *Scale Parameter* (α). Waktu *breakdown* yang tidak signifikan ini mengakibatkan kemungkinan deviasi yang kecil pada data-data yang dimiliki oleh *dump truck* HDT2472. Pada HDT2472 nilai α sebesar 40,4529 dan nilai β sebesar 1,2056.

Nilai α menunjukkan deviasi yang dimiliki oleh data kerusakan HDT2472, semakin besar nilai α maka semakin landai grafik yang dimiliki oleh data tersebut. Gambar 5.3 merupakan plot grafik interval kerusakan dengan software Minitab pada *dump truck* Komatsu, pada grafik tersebut garis HDT2472 memiliki nilai PDF paling tinggi, ini dipengaruhi oleh nilai α yang deviasinya berbeda cukup signifikan dibanding nilai α yang dimiliki oleh *dump truck* Komatsu lainnya.



Gambar 5. 3 Plot Grafik MTTF Komatsu

Nilai β menunjukkan *Shape Parameter* yang dimiliki oleh masing-masing *dump truck*, semakin besar nilai β maka *density* dan laju kerusakan yang dimiliki oleh data tersebut makin besar. Pada gambar 5.4 menunjukkan *dump truck* HDT2472 memiliki laju kerusakan lebih tinggi dibanding *dump truck* Komatsu lain. Hal ini dikarenakan nilai β yang dimiliki oleh HDT2472 paling tinggi dibanding yang lain.



Gambar 5. 4 Grafik *Failure Rate* pada MTTF Komatsu

Rendahnya nilai MTTF yang dimiliki oleh disebabkan nilai α yang paling rendah dan nilai β yang paling tinggi dibanding *dump truck* merek Komatsu yang lain. Hal ini sejalan pada gambar 5.3 *skewness* yang dimiliki oleh HDT2472 lebih terlihat serta nilai PDF yang dihasilkan lebih tinggi dibandingkan dengan *dump truck* Komatsu lainnya.

Pada nilai MTTF *dump truck* merek Komatsu lain, nilai terbesar dimiliki oleh HDT2474 sebesar 48,612 jam. Pada HDT2474 nilai α yang dimiliki dibanding yang lain, namun tidak pada nilai β . Pada tabel 4.20 ditunjukkan perbedaan nilai nilai α HDT2474 dengan nilai α HDT2470 cukup signifikan, HDT2470 dijadikan sebagai komparasi karena nilai nilai β yang dimiliki HDT2470 paling rendah dibandingkan yang lain. HDT2470 dipilih karena nantinya dapat dijadikan tandingan nilai MTTF tertinggi, HDT2470 memiliki nilai MTTF sebesar 43,459 jam. Namun, karena nilai α yang dimiliki oleh HDT2474 dan HDT2470 sudah signifikan berbeda maka nilai MTTF tertinggi dimiliki oleh HDT2474.

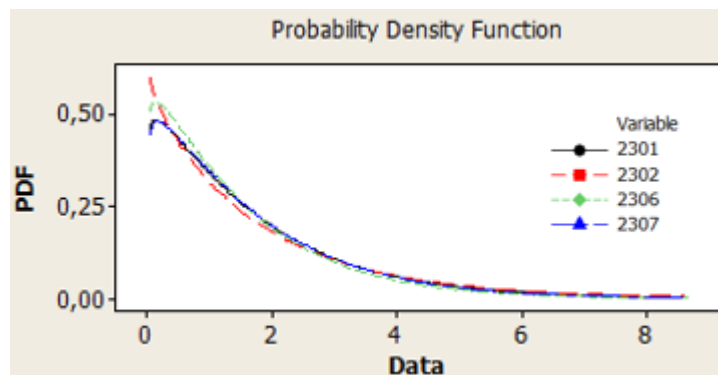
5.2 Analisis Perhitungan *Mean Time to Repair* (MTTR)

Pada subbab ini akan dilakukan Analisa perhitungan MTTR terhadap 2 merek *dump truck* yaitu Caterpillar dan Komatsu.

5.2.1 Analisis Perhitungan MTTR Caterpillar

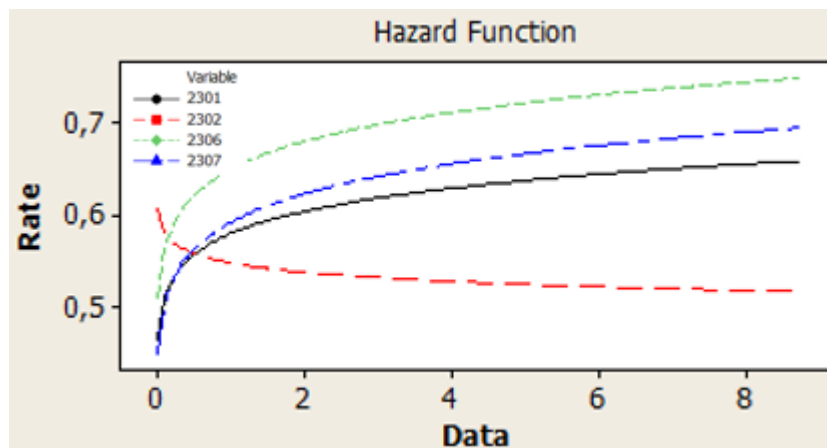
Berdasarkan tabel 4.23, *dump truck* Caterpillar nilai MTTR paling rendah dimiliki oleh *dump truck* HDT2306 yaitu sebesar 1,551 jam. Rendahnya nilai MTTR ini seperti yang terdapat pada lampiran 2, HDT 2306 memiliki interval perbaikan yang nilai deviasinya cenderung kecil, hal ini berdampak pada nilai α . Pada HDT2306 nilai α sebesar 1,5908 dan nilai β sebesar 1,0665.

Pada nilai α menunjukkan semakin besar nilai α maka semakin landai grafik yang dimiliki oleh data tersebut. Gambar 5.5 merupakan plot grafik interval waktu perbaikan dengan software Minitab pada *dump truck* Caterpillar, pada grafik tersebut garis HDT2306 memiliki nilai stasioner paling tinggi, ini dipengaruhi oleh nilai β yang besarnya lebih dari satu, sehingga menghasilkan titik balik pada grafik.



Gambar 5. 5 Plot Grafik MTTR Caterpillar

Pada nilai β menunjukkan *Shape Parameter* yang dimiliki oleh masing-masing *dump truck*, semakin besar nilai β maka *density* dan laju kerusakan yang dimiliki oleh data tersebut makin besar, begitu pun sebaliknya. Pada tabel 4.23, *dump truck* HDT2302 memiliki nilai β yang kurang dari 1, sehingga pada gambar 5.5 garis yang dimiliki oleh *dump truck* 2302 tidak memiliki titik balik. Pada gambar 5.5 nilai β pada MTTR *dump truck* Caterpillar cenderung linear, karena nilainya sebagian besar mendekati 1. Pada gambar 5.6 menunjukkan *dump truck* HDT2472 memiliki laju perbaikan lebih tinggi dibanding *dump truck* Caterpillar lain. Hal ini dikarenakan nilai β yang dimiliki oleh HDT2472 paling tinggi dibanding yang lain.



Gambar 5. 6 Grafik laju perbaikan pada MTTR Caterpillar

Berdasarkan gambar 5.6 terdapat 2 jenis pola grafik, pada *dump truck* HDT2301, HDT2306, dan HDT2307 nilai laju perbaikan cenderung bertambah, sedangkan pada *dump truck* HDT2302 laju perbaikannya cenderung menurun. Gambar yang terjadi pada grafik dipengaruhi oleh perbedaan nilai β

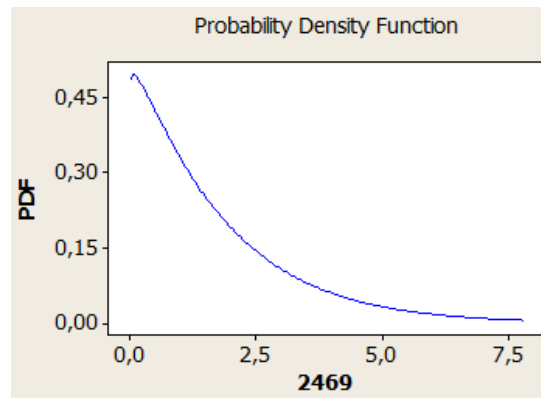
Pada nilai MTTR *dump truck* merek Caterpillar lain, nilai terbesar dimiliki oleh HDT2302 sebesar 1,825 jam. Hal ini disebabkan oleh nilai α dan nilai β yang superlatif. nilai α yang paling tinggi dan nilai β yang paling rendah pada HDT2302. Dalam perhitungan MTTR nilai β menjadi denominator, sehingga ketika nilainya kurang dari satu hasil perhitungannya akan lebih besar.

5.2.2 Analisis Perhitungan MTTR Komatsu

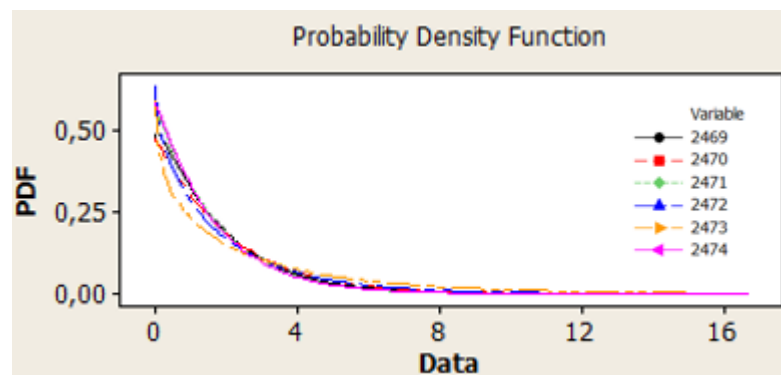
Berdasarkan tabel 4.23, nilai MTTR *dump truck* Komatsu paling rendah dimiliki oleh *dump truck* HDT2471 yaitu sebesar 1,536 jam. Rendahnya nilai MTTR ini seperti yang terdapat pada lampiran 2, HDT 2471 memiliki interval perbaikan yang nilai deviasinya cenderung kecil, hal ini berdampak pada nilai α . Pada HDT2471 nilai α sebesar 1,5826 dan nilai β sebesar 1,081.

Pada nilai α menunjukkan semakin besar nilai α maka semakin landai grafik yang dimiliki oleh data tersebut. Gambar 5.7 merupakan plot grafik interval waktu perbaikan dengan software Minitab pada *dump truck* Komatsu, pada grafik tersebut garis HDT2473 lebih landai dibanding garis lain, hal ini disebabkan oleh nilai α yang paling besar diantara yang lain. Penyebab lain landainya garis yang dimiliki oleh HDT2473 adalah nilai β yang bernilai kurang dari satu. Pada grafik tersebut

nilai PDF yang dimiliki oleh MTTF *dump truck* Komatsu cenderung tidak memiliki titik balik, kecuali HDT2469. Gambar 5.7 merupakan plot grafik MTTR HDT2469.



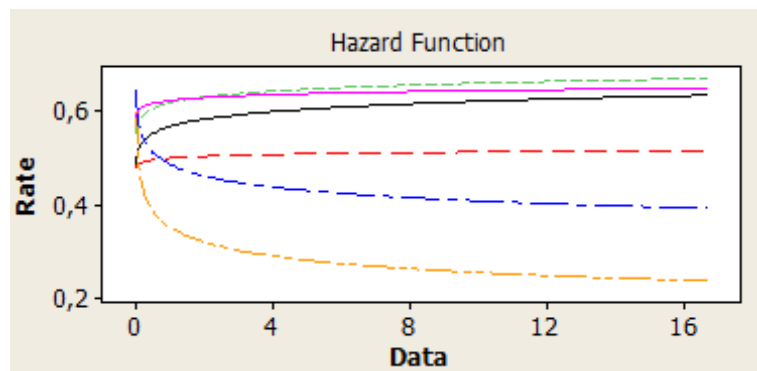
Gambar 5. 7 Plot Grafik MTTR *dump truck* Komatsu HDT2469



Gambar 5. 8 Plot Grafik MTTR *dump truck* Komatsu

Pada nilai β menunjukkan *Shape Parameter* yang dimiliki oleh masing-masing *dump truck*, semakin besar nilai β maka *density* dan laju perbaikan yang dimiliki oleh data tersebut makin besar, begitu pun sebaliknya. Pada tabel 4.23, terdapat beberapa *dump truck* yang memiliki nilai β yang kurang dari 1 diantaranya HDT2472 dan HDT2473, sehingga pada gambar 5.8 garis yang dimiliki oleh dump tidak memiliki titik balik. Pada gambar 5.9 nilai β pada MTTR *dump truck* Caterpillar cenderung linear, karena nilainya sebagian besar mendekati 1. Pada gambar 5.9 ditunjukkan garis HDT2470 menyerupai linear namun sedikit terjadi penambahan di akhir, hal ini disebabkan oleh nilai β yang mendekati 1. Sedangkan pada HDT2469 dan HDT2474 cenderung lebih curam dibanding HDT2470, sehingga pada HDT2469 dan HDT2474 memiliki laju perbaikan lebih besar

dibanding HDT2470. Pada garis HDT2472 dan HDT2473 laju perbaikan cenderung mengalami penurunan, hal ini dipengaruhi oleh nilai β kurang dari 1.



Gambar 5. 9 Grafik laju perbaikan pada MTTR Caterpillar

5.3 Analisis Perhitungan Waktu dan Biaya Optimal

Pada subbab ini akan dilakukan Analisa perhitungan waktu dan biaya optimal *grouping Maintenance* terhadap 2 merek *dump truck* yaitu Caterpillar dan Komatsu.

5.3.1 Analisa Perhitungan Waktu dan Biaya Optimal Caterpillar

Berdasarkan subbab 4.9.1 *grouping Maintenance* optimal *dump truck* Caterpillar didapatkan jumlah *group* optimal untuk melakukan *Maintenance* adalah sebanyak 4 *group* dengan biaya sebesar Rp1.234.928. Waktu optimal untuk melakukan untuk melakukan *grouping Maintenance* masing-masing sebesar 1,6972 jam, 3,055 jam, 1,4996 jam, dan 2,4877 jam.

Berdasarkan persamaan 2.10 waktu optimal *grouping Maintenance* dipengaruhi oleh nilai α dan β , biaya setup (C_s), biaya *minimal repair* (C_{mi}), dan biaya penggantian (C_{ri}). Besarnya waktu optimal *grouping Maintenance* paling kritis dipengaruhi oleh numerator, denominator dan pangkat yang terdapat pada persamaan 2.10. Pada persamaan tersebut notasi numerator adalah C_s dan C_{ri} , notasi denominator adalah α , β , dan C_{mi} , dan untuk notasi pangkat adalah β . Berdasarkan tabel 4.29 rasio antara numerator dengan biaya minimal repair untuk masing-

masing *group* adalah sebesar 9,46; 12,74; 10,48; dan 28,45. Berdasarkan rasio numerator dan biaya minimal repair, nilai yang didapat sudah cukup besar.

Hasil rasio tersebut akan menjadi lebih kecil ketika perhitungan dilakukan pembagian dengan nilai α^β seperti pada persamaan 2.10, maka nilai rasio sebelumnya masing-masing menjadi 0,386; 0,638; 0,448; dan 0,911. Dalam penelitian ini nilai α dan β menjadi notasi paling kritis dalam menentukan waktu optimal. Hal ini dikarenakan nilai α bertambah secara eksponensial, semakin besar nilai α dengan β konstan maka semakin kecil. Begitu pula dengan nilai β , semakin besar nilai β dengan nilai α konstan waktu optimal akan semakin kecil. Waktu optimal yang kecil ini menunjukkan tidak adanya standar waktu untuk tiap-tiap *dump truck* melakukan *Maintenance*. Sehingga dengan dilakukannya waktu optimal *Maintenance* dapat memperkecil deviasi pada interval waktu *Maintenance*. sehingga semakin kecil deviasi yang terjadi pada interval waktu *Maintenance* akan berdampak pada menurunnya nilai α dan nilai β . Sehingga untuk perencanaan *Maintenance* jangka panjang dengan melakukan perhitungan waktu optimal nilainya akan bertambah. Pada *dump truck* Caterpillar biaya masing-masing *grouping Maintenance* sebesar Rp368.274, Rp530.812, Rp335.842, dan Rp870.426

Pada jurnal Chang et. Al (2016), ketika didapatkan jumlah *grouping Maintenance* optimal sama dengan jumlah unit, maka nilai *setup cost* yang dimiliki oleh *dump truck* relatif rendah, sehingga ketika kegiatan *Maintenance* dilakukan tidak menjadi dampak yang cukup besar terhadap biaya *Maintenance*. Gambar 5.10 dan 5.11 akan ditampilkan komparasi biaya *setup cost* eksisting dengan biaya *setup cost* 100 kali lebih besar dibanding eksisting.

| | |
|---|---|
| <pre>p1 = [46.5521; 1.2239; 80060669; 1885372; 8658400]; p2 = [47.1044; 1.1541; 108350008; 1992386; 8658400]; p3 = [40.0950; 1.291; 89071554; 1695726; 8658400]; p4 = [47.2396; 1.2909; 244548456; 1851068; 8658400]; x = [p1 p2 p3 p4]; n = 4; auto_tege(n, 1, x);</pre> | <pre>p1 = [46.5521; 1.2239; 80060669; 1885372; 8658400]; p2 = [47.1044; 1.1541; 108350008; 1992386; 8658400]; p3 = [40.0950; 1.291; 89071554; 1695726; 8658400]; p4 = [47.2396; 1.2909; 244548456; 1851068; 8658400]; x = [p1 p2 p3 p4]; n = 4; auto_tege(n, 4, x);</pre> |
| ETC1: 1318253.5586. | ETC1: 1266030.5868. |

Gambar 5. 10 Biaya Optimal *Grouping Maintenance* Caterpillar Eksisting

| | |
|---|---|
| <code>p1 = [46.5521; 1.2239; 80060669; 1885372; 865840000];</code> | <code>p1 = [46.5521; 1.2239; 80060669; 1885372; 865840000];</code> |
| <code>p2 = [47.1044; 1.1541; 108350008; 1992386; 865840000];</code> | <code>p2 = [47.1044; 1.1541; 108350008; 1992386; 865840000];</code> |
| <code>p3 = [40.0950; 1.291; 89071554; 1695726; 865840000];</code> | <code>p3 = [40.0950; 1.291; 89071554; 1695726; 865840000];</code> |
| <code>p4 = [47.2396; 1.2909; 244548456; 1851068; 865840000];</code> | <code>p4 = [47.2396; 1.2909; 244548456; 1851068; 865840000];</code> |
| <code>x = [p1 p2 p3 p4];</code> | <code>x = [p1 p2 p3 p4];</code> |
| <code>n = 4;</code> | <code>n = 4;</code> |
| <code>auto_tege(n, 1, x);</code> | <code>auto_tege(n, 4, x);</code> |
| ETC1: 1607888.2437 | ETC1: 1871916.5802. |

Gambar 5. 11 Biaya Optimal *Grouping Maintenance* Caterpillar Setup Cost 100x Lebih Besar

Pada gambar 5.11 ditunjukkan apabila biaya setup cost dinaikkan hingga 100 kali lebih besar, maka akan lebih optimal jika *grouping Maintenance* dilakukan menjadi 1 *group* dengan biaya total sebesar Rp1.607.888 dibandingkan menerapkan *grouping Maintenance Policy* dengan jumlah *group* sama dengan jumlah unit *dump truck* dengan biaya total sebesar Rp1.871.916.

5.3.2 Analisa Perhitungan Waktu dan Biaya Optimal Komatsu

Berdasarkan subbab 4.9.1 *grouping Maintenance* optimal *dump truck* Komatsu didapatkan jumlah *group* optimal untuk melakukan *Maintenance* adalah sebanyak 6 *group* dengan biaya sebesar Rp1.845.058. Waktu optimal untuk melakukan *grouping Maintenance* masing-masing sebesar 0,363 jam, 1,677 jam, 0,786 jam, 1,714 jam, 1,625 jam dan 1,635 jam.

Berdasarkan persamaan 2.10 waktu optimal *grouping Maintenance* dipengaruhi oleh nilai α dan β , biaya setup (C_s), biaya *minimal repair* (C_{mi}), dan biaya penggantian (C_{ri}). Besarnya waktu optimal *grouping Maintenance* paling kritis dipengaruhi oleh numerator, denominator dan pangkat yang terdapat pada persamaan 2.10. Pada persamaan tersebut notasi numerator adalah C_s dan C_{ri} , notasi denominator adalah α , β , dan C_{mi} , dan untuk notasi pangkat adalah β . Berdasarkan tabel 4.29 rasio antara numerator dengan biaya minimal repair untuk masing-masing *group* adalah sebesar 2,64; 6,76; 3,68; 9,46; 17,35; dan 12,98. Berdasarkan rasio numerator dan biaya minimal repair, nilai yang didapat sudah cukup besar.

Hasil rasio tersebut akan menjadi lebih kecil ketika perhitungan dilakukan pembagian dengan nilai α^β seperti pada persamaan 2.10, maka nilai rasio sebelumnya masing-masing menjadi 0,0525; 0,4604; 0,1360; 0,5319; 0,3979 dan 0,4019. Dalam penelitian ini nilai α dan β menjadi notasi paling kritis dalam

menentukan waktu optimal. Hal ini dikarenakan nilai α bertambah secara eksponensial, semakin besar nilai α dengan β konstan maka semakin kecil. Begitu pula dengan nilai β , semakin besar nilai β dengan nilai α konstan waktu optimal akan semakin kecil. Waktu optimal yang kecil ini menunjukkan tidak adanya standar waktu untuk tiap-tiap *dump truck* melakukan *Maintenance*. Sehingga dengan dilakukannya waktu optimal *Maintenance* dapat memperkecil deviasi pada interval waktu *Maintenance*. sehingga semakin kecil deviasi yang terjadi pada interval waktu *Maintenance* akan berdampak pada menurunnya nilai α dan nilai β . Sehingga untuk perencanaan *Maintenance* jangka panjang dengan melakukan perhitungan waktu optimal nilainya akan bertambah. Pada *dump truck* Komatsu biaya masing-masing *grouping Maintenance* sebesar Rp300.395, Rp234.721, Rp227.399, Rp263.471, Rp489.908, dan Rp329.165.

| | |
|---|---|
| <pre>p1 = [49.1578; 1.2485; 18079849; 1922600; 7576100]; p2 = [45.8693; 1.2485; 49109335; 2109916; 7576100]; p3 = [47.2625; 1.2485; 26235332; 1679158; 7576100]; p4 = [40.4529; 1.2485; 69459024; 2259711; 7576100]; p5 = [49.8794; 1.2485; 128158656; 3300393; 7576100]; p6 = [52.0972; 1.2485; 96635439; 1752498; 7576100]; x = [p1 p2 p3 p4 p5 p6]; n = 6; auto_tege(n, 1, x);</pre> | <pre>p1 = [49.1578; 1.3082; 18079849; 1922600; 7576100]; p2 = [45.8693; 1.1682; 49109335; 2109916; 7576100]; p3 = [47.2625; 1.2332; 26235332; 1679158; 7576100]; p4 = [40.4529; 1.2056; 69459024; 2259711; 7576100]; p5 = [49.8794; 1.2859; 128158656; 3300393; 7576100]; p6 = [52.0972; 1.2401; 96635439; 1752498; 7576100]; x = [p1 p2 p3 p4 p5 p6]; n = 6; auto_tege(n, 6, x);</pre> |
| ETC1: 2009350.5723 | ETC1: 1994108.3085. |

Gambar 5. 12 Biaya Optimal *Grouping Maintenance* Komatsu Eksisting

| | |
|---|---|
| <pre>p1 = [49.1578; 1.3082; 18079849; 1922600; 757610000]; p2 = [45.8693; 1.1682; 49109335; 2109916; 757610000]; p3 = [47.2625; 1.2332; 26235332; 1679158; 757610000]; p4 = [40.4529; 1.2056; 69459024; 2259711; 757610000]; p5 = [49.8794; 1.276; 128158656; 3300393; 757610000]; p6 = [52.0972; 1.276; 96635439; 1752498; 757610000]; x = [p1 p2 p3 p4 p5 p6]; n = 6; auto_tege(n, 1, x);</pre> | <pre>p1 = [49.1578; 1.3082; 18079849; 1922600; 757610000]; p2 = [45.8693; 1.1682; 49109335; 2109916; 757610000]; p3 = [47.2625; 1.2332; 26235332; 1679158; 757610000]; p4 = [40.4529; 1.2056; 69459024; 2259711; 757610000]; p5 = [49.8794; 1.276; 128158656; 3300393; 757610000]; p6 = [52.0972; 1.276; 96635439; 1752498; 757610000]; x = [p1 p2 p3 p4 p5 p6]; n = 6; auto_tege(n, 6, x);</pre> |
| ETC1: 2328757.4136 | ETC1: 3338947.7840. |

Gambar 5. 13 Biaya Optimal *Grouping Maintenance* Komatsu Setup Cost 100x Lebih Besar

Pada gambar 5.11 ditunjukkan apabila biaya setup cost dinaikkan hingga 100 kali lebih besar, maka akan lebih optimal jika *grouping Maintenance* dilakukan menjadi 1 *group* dengan biaya total sebesar Rp2.328.757 dibandingkan menerapkan

grouping Maintenance Policy dengan jumlah *group* sama dengan jumlah unit *dump truck* dengan biaya total sebesar Rp3.338.947.

5.4 Analisis Kalender *Grouping Maintenance* dalam Periode 1 Bulan

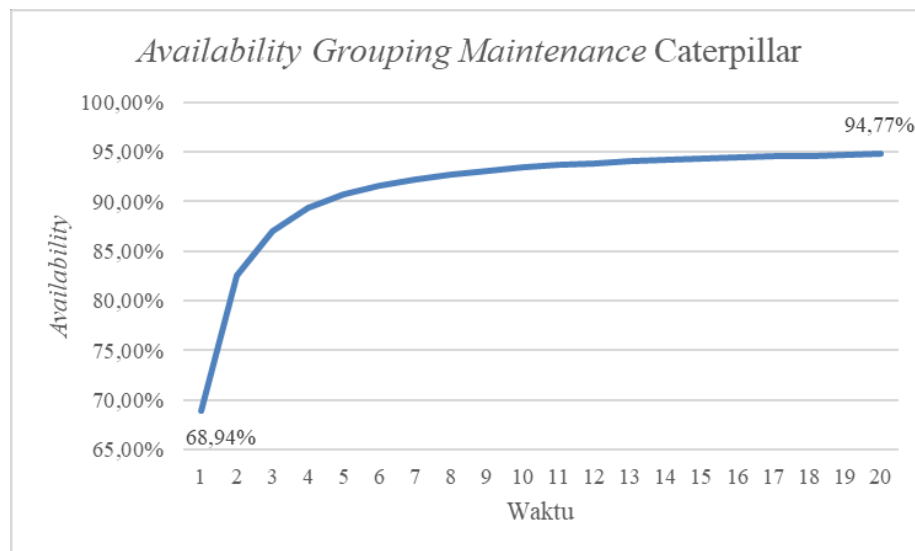
Pada bab 4 telah dijelaskan mengenai pembuatan kalender *grouping Maintenance* dalam periode 1 bulan operasi. Kalender tersebut dibuat dengan cara *plotting* interval waktu *Maintenance* berdasarkan waktu optimal tiap-tiap *dump truck*. Operasional *lessor* dalam 1 hari terdapat 3 shift, yang tiap shift berdurasi 8 jam. Pada kalender interval *Maintenance* horizon waktu dibagi tiap 10 menit. Hal ini dikarenakan waktu optimal *grouping Maintenance* masih dalam bentuk jam sehingga harus dilakukan konversi ke dalam bentuk menit untuk mengakomodasi kalender *grouping Maintenance* selama 1 bulan.

5.5 Analisis Perhitungan *Availability Grouping Maintenance*

Pada subbab ini akan dilakukan Analisa perhitungan *availability grouping Maintenance* optimal terhadap 2 merek *dump truck* yaitu Caterpillar dan Komatsu.

5.5.1 Analisis Perhitungan *Availability Grouping Maintenance Caterpillar*

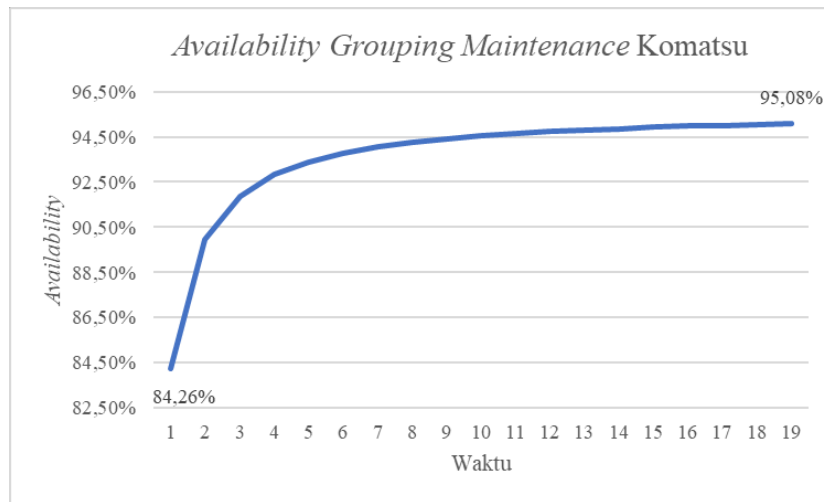
Berdasarkan perhitungan biaya *grouping Maintenance* optimal Caterpillar pada subbab 4.9.1, maka *grouping Maintenance Policy* terpilih adalah sejumlah 4. Nilai *availability* masing-masing *group* berdasarkan subbab 4.11.1, untuk *group* 1 sebesar 96,189%; *group* 2 sebesar 96,083%; *group* 3 sebesar 95,984%; dan *group* 4 sebesar 96,266%. Perhitungan nilai *availability* ini didapat dari nilai MTTF dan MTTR masing-masing *group* yang terdapat pada tabel 4.36. Berdasarkan tabel 4.24 didapatkan nilai *availability* eksisting yang dimiliki oleh *dump truck* Caterpillar adalah sebesar 68,94%. Pada Subbab 4.11.1 *grouping Maintenance Policy* ini memiliki rata-rata *availability* yang dapat terjadi pada *dump truck* Caterpillar mencapai 96,131%. Sehingga untuk nilai *availability* jangka panjang *availability* yang terjadi pada *dump truck* Caterpillar akan mendekati 96,131% dengan asumsi tidak ada terjadi kerusakan tiba-tiba pada *dump truck* Caterpillar. Gambar 5.14 menunjukkan peningkatan *availability* yang terjadi *dump truck* Caterpillar.



Gambar 5. 14 Peningkatan *Availability* Caterpillar Jangka Panjang

5.5.2 Analisis Perhitungan *Availability Grouping Maintenance Komatsu*

Berdasarkan perhitungan biaya *grouping Maintenance* optimal Komatsu pada subbab 4.9.2, maka *grouping Maintenance Policy* terpilih adalah sejumlah 6. Nilai *availability* masing-masing *group* berdasarkan subbab 4.11.2, untuk *group* 1 sebesar 96,262%; *group* 2 sebesar 95,739%; *group* 3 sebesar 96,538%; *group* 4 sebesar 94,829%; *group* 5 sebesar 93,834%; dan *group* 4 sebesar 96,806%. Perhitungan nilai *availability* ini didapat dari nilai MTTF dan MTTR masing-masing *group* yang terdapat pada tabel 4.37. Berdasarkan tabel 4.24 didapatkan nilai *availability* eksisting yang dimiliki oleh *dump truck* Komatsu adalah sebesar 84,26%. Pada Subbab 4.11.2 *grouping Maintenance Policy* ini memiliki rata-rata *availability* yang dapat terjadi pada *dump truck* Caterpillar mencapai 95,6847%. Sehingga untuk nilai *availability* jangka panjang *availability* yang terjadi pada *dump truck* Komatsu akan mendekati 95,6847% dengan asumsi tidak ada terjadi kerusakan tiba-tiba pada *dump truck* Komatsu. Gambar 5.15 menunjukkan peningkatan *availability* yang terjadi *dump truck* Komatsu.



Gambar 5. 15 Peningkatan *Availability* Komatsu Jangka Panjang

BAB 6

KESIMPULAN DAN SARAN

Pada bab 6 ini akan menjelaskan mengenai penarikan kesimpulan yang merupakan hasil dari penelitian yang telah dilakukan. Untuk selanjutnya akan dilakukan pemberian saran untuk pengembangan penelitian lebih jauh

6.1 Kesimpulan

Berikut ini merupakan kesimpulan yang diperoleh dari penelitian yang telah dilakukan:

1. Berdasarkan pertimbangan biaya optimal, untuk masing-masing merk *dump truck* jumlah *grouping maintenance* optimal untuk Caterpillar adalah 4 *group* dan untuk Komatsu adalah 6 *group*. Dengan total biaya masing-masing sebesar Rp1.234.928 dan Rp1.845.058.
2. Pada perhitungan waktu *grouping maintenance* optimal berdasarkan merek *dump truck*, untuk Caterpillar interval waktu *maintenance* tiap-tiap *group* berdasarkan biaya optimal *grouping maintenance* untuk masing-masing *group* melakukan *maintenance* adalah 1,6972 jam, 3,055 jam, 1,4996 jam, dan 2,4877 jam. Pada *dump truck* Komatsu interval waktu *maintenance* tiap-tiap *group* berdasarkan biaya optimal *grouping maintenance* untuk masing-masing *group* melakukan *maintenance* adalah 0,3625 jam, 1,677 jam, 0,7826 jam, 1,7144 jam, 1,6246 jam, dan 1,6351 jam.
3. Pada *dump truck* Caterpillar didapatkan nilai MTTF dengan *grouping maintenance* optimal pada tiap *group* adalah 43,574 jam, 44,783 jam, 37,083 jam dan 43,692 jam. Sedangkan pada nilai MTTR tiap-tiap *group* adalah sebesar 1,727 jam, 1,825 jam, 1,551 jam, dan 1,695 jam. Pada *dump truck* Komatsu didapatkan nilai MTTF dengan *grouping maintenance* optimal pada tiap *group* adalah 45,344 jam, 43,459 jam, 44,158 jam, 38,007 jam, 46,171 jam dan 48,612 jam. Sedangkan pada nilai MTTR tiap-tiap *group* adalah sebesar 1,761 jam, 1,934 jam, 1,536 jam, 2,072 jam, 3,034 jam dan 1,604 jam.

4. Dengan menerapkan metode *grouping maintenance* optimal berdasarkan merek *dump truck*, untuk Caterpillar peningkatan *availability* tiap-tiap group berdasarkan biaya optimal *grouping maintenance* adalah sebesar 96,189%; 96,083%; 95,984%; dan 96,266% dengan rata-rata *availability* sistem mengalami peningkatan sebesar 96,131%. Pada *dump truck* Komatsu peningkatan *availability* tiap-tiap group berdasarkan biaya optimal *grouping maintenance* adalah sebesar 96,262%; 95,793%; 96,638%; 94,829%; 93,834%; dan 96,806% dengan rata-rata *availability* sistem mengalami peningkatan sebesar 95,6847%
5. Kalender *maintenance* dibuat dalam jangka waktu 1 bulan, ini dikarenakan satuan waktu yang digunakan oleh lessor adalah jam. Kalender *maintenance* dibuat berdasarkan waktu *grouping maintenance* optimal tiap group berdasarkan biaya yang paling optimal, kemudian disesuaikan dengan waktu perawatannya.

6.2 Saran

Berikut ini merupakan saran yang dapat diberikan oleh penulis, untuk penelitian selanjutnya:

1. Untuk Peneliti, dalam melakukan pengumpulan data dibuat sedetail mungkin untuk mempermudah dan mempercepat pengolahan data. Penelitian dapat dilakukan dengan mengkombinasikan seluruh *dump truck* dengan tidak dibatasi oleh merek yang dimiliki lessor.
2. Untuk perusahaan, diperlukan pengembangan sistem informasi terintegrasi berdasarkan waktu operasi, waktu kerusakan, waktu perbaikan, biaya tiap perbaikan, perhitungan *opportunity loss* di setiap terjadi *downtime* serta pembaharuan nilai *availability* seiring berjalannya waktu pada seluruh kendaraan yang dimiliki.

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DAFTAR LAMPIRAN

| | |
|--|-----|
| Lampiran 1 : <i>Time to Failure</i> | 88 |
| Lampiran 2 : <i>Time to Repair</i> | 93 |
| Lampiran 3 : Biaya Optimal <i>Grouping Maintenance</i> Komatsu..... | 99 |
| Lampiran 4 : <i>Grouping Maintenance</i> Komatsu Berdasarkan <i>Availability</i> | 102 |
| Lampiran 5 : <i>Built-in function</i> Waktu dan Biaya Optimal <i>Grouping Maintenance</i> | 105 |
| Lampiran 6 : Penjadwalan <i>Grouping Maintenance Policy</i> | 107 |

Lampiran 1 : *Time to Failure*

Berikut akan ditampilkan nilai *Time to Failure* pada masing-masing *dump truck*

| 2301 | | | | | | | | | | | | | | | | | | |
|--------|--------|-------|-------|--------|--------|--------|--------|-------|-------|-------|--------|-------|-------|-------|-------|--------|-------|-------|
| 70,9 | 15,25 | 10 | 35,5 | 39,4 | 49,5 | 12,1 | 16,65 | 5,4 | 12 | 18,25 | 3,1 | 82,45 | 19 | 4,1 | 75,9 | 118,35 | 23,6 | 54 |
| 110 | 1,8 | 324,4 | 24 | 7,95 | 64,65 | 13,4 | 18,25 | 161,5 | 19,15 | 35,6 | 32,55 | 95,9 | 34 | 10,25 | 19,65 | 35,3 | 25,33 | 235,6 |
| 30,7 | 25,6 | 7,35 | 5,35 | 68,75 | 67,65 | 72,5 | 72,9 | 50,65 | 32,9 | 20,3 | 9,85 | 33,5 | 7,65 | 6,85 | 11,5 | 46,25 | 28,05 | 16,4 |
| 70,475 | 58,85 | 37,6 | 5 | 69,75 | 39,6 | 9,2 | 42,7 | 63,55 | 10,8 | 29,05 | 2,75 | 36,35 | 9,55 | 5,65 | 95,25 | 70,4 | 22,9 | 18 |
| 48,05 | 87,65 | 25,8 | 15,4 | 17,8 | 254,45 | 91,75 | 34,5 | 45,65 | 10,7 | 7,65 | 18,85 | 41,6 | 15,5 | 25 | 164,1 | 115,4 | 20,1 | 118,3 |
| 95,15 | 93,55 | 81,1 | 22,8 | 43,35 | 29,65 | 10,3 | 42 | 35,5 | 18 | 8,5 | 2,25 | 22,5 | 15,6 | 55,9 | 14 | 104,85 | 104 | 22,35 |
| 52,65 | 75,35 | 37,35 | 7 | 251,4 | 16,85 | 85,55 | 11 | 10,2 | 12 | 23,4 | 3 | 55,05 | 4,45 | 33,45 | 23,5 | 64,35 | 13,1 | 14,4 |
| 77,75 | 14,1 | 7,9 | 18,35 | 28,75 | 4,2 | 18 | 42,8 | 66,9 | 11,75 | 88,75 | 52,5 | 30,25 | 20,6 | 39,35 | 73,5 | 47,65 | 33,75 | 7,6 |
| 177,65 | 16,7 | 20,6 | 111,5 | 61,85 | 177,85 | 274,55 | 46,35 | 4,25 | 48,3 | 51 | 13 | 24,65 | 21,65 | 6,5 | 9,75 | 56,6 | 9,5 | 19,4 |
| 2,25 | 321,15 | 71,45 | 31,9 | 20,1 | 75,45 | 52,45 | 16,25 | 23,65 | 15,15 | 1,6 | 81,25 | 8,3 | 91,55 | 32,3 | 19,95 | 8,5 | 39,45 | 21 |
| 133,7 | 6 | 29,15 | 97 | 37,2 | 279,2 | 124,15 | 116,15 | 21,25 | 30,8 | 13,8 | 57,85 | 6,5 | 4,55 | 71,35 | 16,75 | 22,15 | 16,15 | 39 |
| 24,5 | 59,1 | 103,6 | 22 | 241,85 | 58,25 | 7,7 | 53 | 3,25 | 8 | 48,2 | 2,25 | 19,35 | 26,95 | 27,65 | 20,05 | 42,35 | 14,05 | 14,15 |
| 25 | 195,75 | 34,85 | 46,1 | 227,65 | 7,75 | 73,8 | 94,3 | 86,75 | 8 | 71,45 | 19,3 | 15,8 | 80,35 | 29 | 11,15 | 5,15 | 35,9 | 10,35 |
| 73,55 | 26,05 | 16 | 21,95 | 63,6 | 91,65 | 96,25 | 94,15 | 48,2 | 3,05 | 24,25 | 42,3 | 10,7 | 25,2 | 5,5 | 7,95 | 28,5 | 24,7 | 16,95 |
| 10,8 | 80,5 | 7,05 | 57,6 | 230,15 | 6,75 | 83,95 | 16 | 23,05 | 3,95 | 33,55 | 101,15 | 81 | 12,5 | 4,15 | 45,5 | 21,15 | 35,2 | 15 |
| 26,15 | 72,05 | 296 | 70,75 | 108,55 | 190,75 | 10,5 | 91,45 | 9,45 | 6,45 | 12,65 | 7,1 | 81 | 26,4 | 23,35 | 15,25 | 7 | 18,7 | 77,45 |
| 42,4 | 53,35 | 21,8 | 22,85 | 43,35 | 136,35 | 99 | 28 | 23 | 95,25 | 54,25 | 41 | 30,5 | 41,7 | 74,9 | 53,15 | 51,85 | 103,2 | 98,35 |
| 169 | 45,65 | 60,6 | 19,2 | 46,65 | 35,95 | | | | | | | | | | | | | |

| 2472 | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|------|-------|--------|-------|-------|-------|------|-------|-------|-------|--------|-------|
| 11 | 27,45 | 18,5 | 27,95 | 10,95 | 2,75 | 41 | 8,65 | 34,45 | 20,95 | 16,35 | 22,65 | 1,35 | 2,1 | 8,75 | 31,25 | 57,2 | 66,7 | 43,25 |
| 5,1 | 7,6 | 72,6 | 12,4 | 6,6 | 17,35 | 69,4 | 49,6 | 115,2 | 10 | 95,9 | 28,9 | 19,05 | 21 | 17,15 | 46,8 | 7,6 | 133,6 | 26 |
| 24,4 | 24,15 | 2,95 | 25 | 7,75 | 5,65 | 41 | 59,6 | 21,35 | 35 | 151,4 | 7,3 | 66,5 | 17,5 | 52,5 | 44,85 | 84,45 | 66,65 | 30,4 |
| 11 | 11,65 | 11,2 | 15,1 | 2,65 | 2,25 | 102,1 | 28,4 | 26 | 123,65 | 15,95 | 71,85 | 36,5 | 94,2 | 76 | 49,05 | 12 | 130,25 | 34,25 |
| 7 | 23,75 | 73,1 | 63,5 | 27,85 | 43,65 | 46,1 | 8,85 | 35,5 | 90,35 | 96,85 | 40,45 | 30,2 | 29,5 | 51,25 | 8,65 | 41,6 | 51,8 | 14,35 |
| 99,25 | 12,9 | 96,25 | | | | | | | | | | | | | | | | |

| 2302 | | | | | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|-------|
| 41,6 | 127,2 | 22,85 | 6,85 | 82,75 | 7,5 | 19,65 | 27,45 | 30 | 49,4 | 80,85 | 304 | 84,1 | 41,4 | 13,6 | 14,5 | 52 | 16,95 | 26,3 |
| 23,5 | 43,35 | 35,8 | 167,75 | 15,85 | 77,3 | 19,9 | 21,7 | 10,75 | 69,35 | 30 | 188,8 | 20 | 105,25 | 12,45 | 49,15 | 55,65 | 6,35 | 17,6 |
| 15,3 | 73 | 15,5 | 43,5 | 54,15 | 17,6 | 47,6 | 2 | 156,6 | 83,25 | 15,5 | 10,35 | 5,35 | 26,25 | 15,35 | 35,85 | 97,55 | 42,6 | 14,55 |
| 141 | 46,55 | 3,25 | 26,75 | 43,75 | 29 | 56,8 | 20,3 | 6,75 | 19,5 | 45,65 | 109,15 | 52,25 | 25,15 | 4,15 | 30,7 | 24,5 | 16 | 10,4 |
| 232 | 350,8 | 13,45 | 26,3 | 3,8 | 11,6 | 4 | 13,95 | 12,1 | 285,45 | 24,15 | 6,55 | 103,25 | 25,25 | 45,8 | 39,75 | 34,5 | 7 | 8,7 |
| 40,3 | 52 | 164,65 | 29,3 | 12,1 | 11,3 | 25,45 | 101,1 | 7,2 | 12,65 | 168,65 | 98,25 | 82 | 33,4 | 26,5 | 51,95 | 47,45 | 77,55 | 8,8 |
| 31,6 | 54,5 | 24,6 | 41,65 | 10,1 | 253 | 82,75 | 71,6 | 95,7 | 9,35 | 45 | 32,35 | 6,6 | 10,6 | 49,75 | 20,5 | 58,35 | 37,75 | 10,3 |
| 43,9 | 18,35 | 17 | 8,9 | 15,6 | 48,4 | 3,85 | 7,95 | 5,05 | 281,1 | 156,6 | 79,5 | 105,7 | 1,5 | 2,55 | 83,45 | 25,15 | 76,75 | 10,6 |
| 21 | 119,95 | 182,25 | 19,1 | 2,1 | 62,6 | 69,05 | 9,3 | 118,9 | 30,4 | 82,2 | 118,75 | 50,1 | 7,15 | 18,75 | 240 | 15 | 25,25 | 3,55 |
| 146,9 | 45,75 | 4,35 | 61,55 | 159,15 | 26,35 | 3,8 | 50,4 | 140,6 | 248,3 | 35,2 | 21,15 | 15,05 | 12,85 | 9,25 | 50,1 | 67 | 43,9 | 9,6 |
| 170,7 | 24 | 28,25 | 148,5 | 225,35 | 38,9 | 17,35 | 15,2 | 76,1 | 29,6 | 123,05 | 5,15 | 52,55 | 20,4 | 4,5 | 9,25 | 32,5 | 14,2 | 8,35 |
| 62,315 | 46,35 | 16,85 | 36,25 | 9 | 86,2 | 10,35 | 34,9 | 23,6 | 48,5 | 50,3 | 7,9 | 36,75 | 10,95 | 5,25 | 71,65 | 4,1 | 28,55 | 5,85 |
| 60,2 | 25,25 | 38 | 5,75 | 11,55 | 110,15 | 40 | 10,65 | 58,65 | 70,7 | 28,6 | 20,5 | 5,3 | 6,95 | 27,3 | 29,5 | 13 | 104,95 | 11,6 |
| 122,9 | 347,65 | 16,65 | 3,85 | 12,3 | 31,85 | 1,95 | 7,95 | 41,3 | 28,1 | 184,4 | 21,7 | 138,25 | 24,9 | 29,65 | 7,75 | 20,65 | 51 | 8,25 |
| 441 | 24,95 | 14,2 | 7,15 | 46,6 | 61,9 | 59,5 | 5,65 | 63,9 | 308,1 | 67,85 | 32,25 | 76,15 | 5,8 | 13,6 | 8 | 26,9 | 32,05 | |
| 55,25 | 29,55 | 39,65 | 19 | 105,6 | 22,75 | 34,6 | 17 | 259,4 | 17,15 | 41,55 | 33,3 | 2,85 | 13,85 | 14,95 | 27,5 | 15,1 | 12,1 | |
| 381,6 | 30,5 | 31,85 | 4 | 122,45 | 26,65 | 7,9 | 16,55 | 354,2 | 33,3 | 5,85 | 147,75 | 31,15 | 41 | 46,6 | 15,55 | 6,1 | 20,7 | |
| 11,4 | 66,05 | 33,05 | 16,1 | 30,55 | 10,95 | 3,75 | 6,05 | 216,65 | 367,7 | 9,9 | 119,35 | 10,15 | 12,7 | 24 | 19,45 | 20,15 | 16,4 | |
| 43,65 | 60,25 | 18,55 | 67,75 | 17,65 | 37,65 | 2,15 | 33,05 | 377,55 | 329,65 | 348,2 | 78,9 | 5,9 | 25,25 | 43,5 | 11,7 | 6,8 | 23,15 | |
| 2470 | | | | | | | | | | | | | | | | | | |
| 34,9 | 12,1 | 354,2 | 248,3 | 15,5 | 67,85 | 79,5 | 84,1 | 5,3 | 33,4 | 12,7 | 4,5 | 30,7 | 27,5 | 15 | 6,35 | 51 | 10,3 | 6,75 |
| 10,65 | 7,2 | 216,65 | 29,6 | 45,65 | 41,55 | 118,75 | 20 | 138,25 | 10,6 | 25,25 | 5,25 | 39,75 | 15,55 | 67 | 42,6 | 32,05 | 10,6 | 259,4 |
| 7,95 | 95,7 | 377,55 | 48,5 | 24,15 | 5,85 | 21,15 | 5,35 | 76,15 | 1,5 | 13,6 | 27,3 | 51,95 | 19,45 | 32,5 | 16 | 12,1 | 3,55 | 30,4 |
| 5,65 | 5,05 | 49,4 | 70,7 | 168,65 | 9,9 | 5,15 | 52,25 | 2,85 | 7,15 | 12,45 | 29,65 | 20,5 | 11,7 | 4,1 | 7 | 20,7 | 9,6 | 30 |
| 17 | 118,9 | 69,35 | 28,1 | 45 | 348,2 | 7,9 | 103,25 | 31,15 | 12,85 | 15,35 | 13,6 | 83,45 | 52 | 13 | 77,55 | 16,4 | 8,35 | 184,4 |
| 16,55 | 140,6 | 83,25 | 308,1 | 156,6 | 304 | 20,5 | 82 | 10,15 | 20,4 | 4,15 | 14,95 | 240 | 55,65 | 20,65 | 37,75 | 23,15 | 5,85 | 32,35 |
| 6,05 | 76,1 | 19,5 | 17,15 | 82,2 | 188,8 | 21,7 | 6,6 | 5,9 | 10,95 | 45,8 | 46,6 | 50,1 | 97,55 | 26,9 | 76,75 | 26,3 | 11,6 | 78,9 |
| 33,05 | 23,6 | 285,45 | 33,3 | 35,2 | 10,35 | 32,25 | 105,7 | 41,4 | 6,95 | 26,5 | 24 | 9,25 | 24,5 | 15,1 | 25,25 | 17,6 | 8,25 | 36,75 |
| 30 | 58,65 | 12,65 | 367,7 | 123,05 | 109,15 | 33,3 | 50,1 | 105,25 | 24,9 | 49,75 | 43,5 | 71,65 | 34,5 | 6,1 | 43,9 | 14,55 | 25,15 | 25,25 |
| 10,75 | 41,3 | 9,35 | 329,65 | 50,3 | 6,55 | 147,75 | 15,05 | 26,25 | 5,8 | 2,55 | 14,5 | 29,5 | 47,45 | 20,15 | 14,2 | 10,4 | 16,95 | 41 |
| 156,6 | 63,9 | 281,1 | 80,85 | 28,6 | 98,25 | 119,35 | 52,55 | 25,15 | 13,85 | 18,75 | 49,15 | 7,75 | 58,35 | 6,8 | 28,55 | 8,7 | 104,95 | 9,25 |
| 8,8 | 35,85 | 8 | | | | | | | | | | | | | | | | |

| 2471 | | | | | | | | | | | | | | | | | | |
|-------|--------|--------|--------|--------|-------|-------|--------|--------|--------|-------|--------|-------|--------|-------|-------|--------|-------|--------|
| 6,75 | 76,75 | 20,4 | 22,35 | 19,55 | 66,8 | 12,9 | 23,5 | 59,35 | 62,7 | 9,45 | 38,4 | 112,4 | 56,35 | 20,85 | 9,85 | 18,425 | 3,75 | 26,5 |
| 17,55 | 6,6 | 55,8 | 4,25 | 57,55 | 32,8 | 72 | 15,2 | 64,85 | 176,65 | 11,15 | 8,25 | 1,65 | 12,85 | 23,75 | 57,6 | 63 | 7 | 142,35 |
| 14,4 | 137,15 | 26,3 | 19,8 | 56,7 | 87,7 | 4,35 | 335,85 | 7,9 | 100,2 | 39,4 | 25,05 | 22,45 | 47,55 | 43,55 | 11,5 | 3,75 | 7,95 | 20,6 |
| 32,4 | 15,25 | 43,4 | 35,25 | 15,05 | 81,6 | 48,15 | 11,5 | 51,4 | 99,35 | 29,7 | 14,85 | 87 | 16,15 | 29,15 | 177,8 | 31,6 | 32,25 | 18,15 |
| 11,1 | 63,15 | 105,05 | 147 | 17,8 | 14,6 | 31,4 | 63 | 183,55 | 25,45 | 44 | 9,15 | 6,65 | 5,15 | 7,2 | 73,05 | 21,15 | 61,5 | 102,4 |
| 14,7 | 11 | 94,6 | 119,8 | 12,05 | 32,95 | 49,45 | 27,7 | 87,25 | 22,65 | 2,75 | 68,05 | 47,4 | 59,75 | 63,35 | 67,6 | 4,95 | 5,9 | |
| 15,85 | 68,5 | 24,85 | 34,6 | 11,1 | 18,95 | 98 | 80,55 | 53,75 | 81 | 44,8 | 71,35 | 37,65 | 25,5 | 63,35 | 37,25 | 14,7 | 90,8 | |
| 58,5 | 44,75 | 12,75 | 51,75 | 68,65 | 2,9 | 21,5 | 15,6 | 105,55 | 55,4 | 92,25 | 149,6 | 15,6 | 77 | 7,5 | 47,25 | 81,35 | 3,75 | |
| 19,5 | 264,85 | 108,3 | 161,1 | 119,6 | 166,6 | 17,1 | 45 | 12 | 26,6 | 19,85 | 4,75 | 8,45 | 82,25 | 23,9 | 72,05 | 6,95 | 7,4 | |
| 99,15 | 169,8 | 35,2 | 14,4 | 38 | 40,75 | 3,9 | 30,85 | 14,6 | 36,1 | 3,2 | 7,65 | 63,5 | 112,15 | 78,35 | 11,25 | 23,45 | 10,25 | |
| 15,6 | 62,65 | 2,75 | 116 | 135,25 | 32,1 | 10,55 | 65 | 9,6 | 88,85 | 65,3 | 111,85 | 29,7 | 60,25 | 7,4 | 21,25 | 17,4 | 20,9 | |
| 73,75 | 58,55 | 20,4 | 119 | 28 | 8,95 | 57,2 | 6,1 | 128,7 | 25,2 | 16,4 | 35,6 | 12 | 21,15 | 71 | 71,65 | 36,35 | 8,9 | |
| 79,35 | 3,95 | 26,95 | 174,25 | 132,05 | 44,5 | 16,5 | 56,7 | 25,8 | 6,15 | 73,75 | 48,05 | 13,5 | 23,15 | 6,65 | 20 | 76,6 | 7,65 | |

| 2469 | | | | | | | | | | | | | | | | | | |
|-------|-------|--------|--------|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| 5 | 22,85 | 61,85 | 49,5 | 91,65 | 10,3 | 14,4 | 116,15 | 50,65 | 9,45 | 11,75 | 13,85 | 70,85 | 11,75 | 10,35 | 15,25 | 22 | 28,5 | 70,75 |
| 15,4 | 22,9 | 20,1 | 64,65 | 6,75 | 85,55 | 64,35 | 53 | 63,55 | 23 | 48,3 | 70,3 | 47,1 | 226,35 | 56 | 35,85 | 35,1 | 70,3 | 28,75 |
| 22,8 | 18 | 37,2 | 67,65 | 190,75 | 18 | 60,6 | 94,3 | 45,65 | 9,5 | 15,15 | 44,6 | 7,55 | 32,6 | 37,4 | 100,8 | 28,65 | 18,35 | 169 |
| 7 | 70,4 | 241,85 | 39,6 | 136,35 | 274,55 | 16,65 | 94,15 | 35,5 | 19,4 | 30,8 | 24,85 | 17,3 | 24,1 | 20,7 | 28,3 | 22,85 | 38 | 7,75 |
| 18,35 | 98,35 | 227,65 | 254,45 | 104 | 52,45 | 18,25 | 16 | 10,2 | 56,6 | 8 | 47,35 | 19,6 | 10 | 14 | 2,65 | 31,4 | 23,65 | 91,75 |
| 111,5 | 39,4 | 63,6 | 29,65 | 22,35 | 124,15 | 72,9 | 91,45 | 66,9 | 45,5 | 38,5 | 14 | 92,15 | 21,35 | 15,5 | 27,65 | 23,65 | 38,6 | 13,1 |
| 31,9 | 7,95 | 230,15 | 16,85 | 104,85 | 7,7 | 42,7 | 28 | 4,25 | 12 | 32,45 | 28,25 | 48,15 | 12,75 | 8,65 | 12,95 | 41,7 | 10,85 | 16,25 |
| 97 | 68,75 | 108,55 | 4,2 | 45,65 | 73,8 | 34,5 | 33,75 | 23,65 | 19,15 | 23,65 | 61 | 3,9 | 37,25 | 54,4 | 7,6 | 83,05 | 9,75 | 161,5 |
| 22 | 69,75 | 43,35 | 177,85 | 12,1 | 96,25 | 42 | 7,6 | 21,25 | 32,9 | 241 | 12,9 | 14,6 | 40,8 | 40 | 16,85 | 0,75 | 35,85 | 23,05 |
| 46,1 | 17,8 | 20,1 | 75,45 | 13,4 | 83,95 | 11 | 47,65 | 3,25 | 10,8 | 23,4 | 13,7 | 95,25 | 29,25 | 22,6 | 20 | 31,2 | 36,35 | 12 |
| 21,95 | 43,35 | 118,3 | 279,2 | 72,5 | 10,5 | 42,8 | 19,2 | 86,75 | 10,7 | 48,05 | 116,4 | 4,1 | 19,4 | 70,8 | 4,25 | 8,75 | 19,8 | 14 |
| 57,6 | 251,4 | 115,4 | 58,25 | 9,2 | 99 | 46,35 | 5,4 | 48,2 | 18 | 14,1 | 52,55 | 62,25 | 62,55 | 33 | 48,45 | 110,1 | 33,7 | 95,5 |
| 91 | 30,3 | 28 | 34,75 | | | | | | | | | | | | | | | |

| 2474 | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|------|--------|------|--------|
| 8 | 46,1 | 12,65 | 53,15 | 11,85 | 35,1 | 94 | 63 | 1,2 | 37 | 3,45 | 86,25 | 11,75 | 46,35 | 15 | 21,5 | 191,95 | 43,5 | 55,45 |
| 35,9 | 12,4 | 58,5 | 42,25 | 87,75 | 36,05 | 70,35 | 5,7 | 25,2 | 25,6 | 28,1 | 30,5 | 16,65 | 6,25 | 39,5 | 57,2 | 62,75 | 9,1 | 121,05 |
| 43 | 24,15 | 1,6 | 7,65 | 23,6 | 18,6 | 52 | 30 | 47,65 | 18,65 | 72,5 | 16 | 58,15 | 61,85 | 16,6 | 82,5 | 25,3 | 87,1 | 28,15 |
| 83,65 | 81,05 | 13,8 | 211,45 | 41,1 | 90,4 | 19,5 | 47,65 | 28,4 | 13,25 | 22,9 | 48 | 245,4 | 68,1 | 31,85 | 5 | 27,6 | 50,9 | 99,2 |
| 147 | 49,35 | 128,4 | 36 | 80 | 49,75 | | | | | | | | | | | | | |

| 2306 | | | | | | | | | | | | | | | | | | |
|-------|-------|--------|-------|-------|--------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|-------|--------|-------|
| 11,2 | 8,75 | 17,25 | 28,55 | 35,1 | 27,05 | 58,15 | 42,05 | 27,5 | 3,3 | 20,5 | 66,1 | 3,35 | 12,8 | 11 | 5,4 | 29,7 | 21,8 | 9,65 |
| 8,75 | 158 | 54 | 3,3 | 43 | 106,55 | 21,05 | 96,5 | 28 | 9,35 | 33,9 | 49,2 | 3,85 | 8,1 | 11,75 | 24 | 8 | 9,7 | 13 |
| 37,05 | 32,25 | 77,9 | 46,2 | 34,15 | 20,05 | 49,8 | 2,4 | 11 | 37,45 | 28 | 21,25 | 47,5 | 13,1 | 48,3 | 56,3 | 200,6 | 24,7 | 47,35 |
| 50,6 | 43,65 | 33,15 | 19,05 | 12 | 23,25 | 13,4 | 137,35 | 21,8 | 8,25 | 24 | 11,65 | 22,3 | 91,25 | 15,3 | 51 | 7 | 43,35 | 22,5 |
| 26,45 | 30,85 | 102,85 | 6,45 | 1,75 | 80 | 45,05 | 341,8 | 78,65 | 42,05 | 24,05 | 35,15 | 31,25 | 7,1 | 30,8 | 32 | 34,3 | 53,75 | 14,5 |
| 14,9 | 25,25 | 105,9 | 28 | 19,65 | 28 | 13,8 | 157,6 | 10,9 | 145,35 | 57,75 | 7,25 | 32 | 40,6 | 16,25 | 1,95 | 85,9 | 25,3 | 39 |
| 36,25 | 104,4 | 64,45 | 47,75 | 12,75 | 16,6 | 67,45 | 22,75 | 16,05 | 2,2 | 8,25 | 15,1 | 15,45 | 23,05 | 29,95 | 7,15 | 79,2 | 23,1 | 38,9 |
| 9,7 | 112,5 | 55 | 49,25 | 8,5 | 10,35 | 19,05 | 21,1 | 40,95 | 19,15 | 38,55 | 32,9 | 18,6 | 9,45 | 8,45 | 41,85 | 80,65 | 40,95 | 4,85 |
| 16 | 145 | 23 | 18,15 | 32,2 | 47 | 40,65 | 25,6 | 3,1 | 78,4 | 31,5 | 11,5 | 46,1 | 23 | 20,65 | 16,4 | 6,7 | 34,7 | 16,1 |
| 51 | 97,65 | 98,5 | 23,1 | 7,15 | 315,1 | 19,75 | 36,4 | 8 | 15 | 83,2 | 28,05 | 15,9 | 9,5 | 122 | 38,85 | 16,25 | 56 | 48 |
| 8,6 | 44 | 31,1 | 88,05 | 12,7 | 91,55 | 83,6 | 12,65 | 4,5 | 22,55 | 21,45 | 35,25 | 22,25 | 43,4 | 1,35 | 50,05 | 6,7 | 56 | 23 |
| 11,35 | 3,95 | 19,4 | 29,1 | 46,55 | 88 | 128 | 127,5 | 124,3 | 93,15 | 21,2 | 108,85 | 52,75 | 32,6 | 17,4 | 24,4 | 16,25 | 37,1 | 36,65 |
| 11,25 | 1,55 | 12,6 | 47,8 | 19,8 | 27,85 | 22,05 | 22,95 | 56,6 | 10,35 | 7,65 | 2,3 | 46,05 | 45,5 | 15,7 | 35,4 | 8,75 | 33,3 | 26 |
| 5,25 | 46,75 | 95,1 | 67,5 | 5,75 | 204,15 | 55,6 | 9,05 | 47,75 | 64,9 | 121,55 | 21,8 | 8,75 | 22 | 8,05 | 28,15 | 28,5 | 39,75 | 23,5 |
| 23,05 | 19,5 | 124,75 | 43,4 | 21,2 | 5,05 | 100,55 | 10,95 | 9 | 22,25 | 64,35 | 89 | 126,25 | 19,15 | 10,95 | 19,45 | 18,35 | 2,3 | 23,3 |
| 21,6 | 21,05 | 7,75 | 38,6 | 18,3 | 51,75 | 4,7 | 9,75 | 46 | 13,55 | 11,05 | 7 | 19,9 | 11,25 | 29 | 9,25 | 31,15 | 29,75 | 11 |
| 80 | 82 | 280 | 69,8 | 110,6 | 50 | 61,7 | 52,8 | 2,65 | 33,85 | 58,4 | 95,65 | 9,75 | 21,4 | 50,1 | 44,75 | 15,45 | 125,45 | 3,7 |
| 2,7 | 31,05 | 54,45 | 12,55 | 27,15 | 80,25 | 47,35 | 39,1 | 7,55 | 58,55 | 87 | 10,4 | 89,5 | 10,8 | 40,6 | 14,95 | 53 | 45,15 | 18,35 |
| 20,65 | 26 | 73,3 | 46,75 | 16,9 | 88,05 | 253,35 | 47,6 | 73,25 | 32,75 | 8,7 | 317,35 | 32,4 | 10,7 | 11,95 | 5,25 | 35,65 | 32,5 | 4,55 |
| 74,55 | 94,75 | 15,5 | 4,05 | 88,7 | 7 | 16 | 8,2 | 25,35 | 48,15 | | | | | | | | | |

| 2473 | | | | | | | | | | | | | | | | | | |
|--------|--------|-------|-------|-------|------|-------|------|------|-------|-------|------|-------|-------|-------|------|--------|-------|-------|
| 66,55 | 23 | 21 | 7,6 | 134,8 | 4,15 | 54,3 | 23 | 51,1 | 103,5 | 23,75 | 9,75 | 8,5 | 69,25 | 31,75 | 91 | 37,35 | 7 | 81,6 |
| 42,95 | 51 | 49,05 | 54,5 | 97 | 16,3 | 31,75 | 22,5 | 25,7 | 7,5 | 4,9 | 12 | 140,7 | 31,75 | 69,8 | 8,6 | 44,15 | 62,6 | 15,15 |
| 23,25 | 118,75 | 13,75 | 21,1 | 7,7 | 10,3 | 116 | 65,2 | 31,5 | 18,5 | 10,25 | 65,5 | 35,6 | 55,25 | 7,5 | 87,1 | 259,15 | 10,9 | 2,8 |
| 141,75 | 11,95 | 48,35 | 70,25 | 99,75 | 40,8 | 27 | 19,9 | 8 | 29,05 | 53,75 | 21,3 | 53,6 | 71,85 | 72,25 | 76,1 | 134,55 | 62,45 | 44,3 |

| 2307 | | | | | | | | | | | | | | | | | | |
|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|--------|--------|--------|-------|--------|--------|-------|--------|--------|
| 59,4 | 4,75 | 38,55 | 10,45 | 19,5 | 83,35 | 16,3 | 2,85 | 2,65 | 11,8 | 40,2 | 28,45 | 54,95 | 122,1 | 124,35 | 105,35 | 35,35 | 51,25 | 20,35 |
| 258,5 | 22,65 | 16,6 | 16,4 | 179,65 | 16,4 | 46 | 15,85 | 95,9 | 13,5 | 6 | 13,8 | 12,6 | 67,85 | 24,25 | 10 | 82 | 10,5 | 15,1 |
| 214 | 12,3 | 438,65 | 126,7 | 3,1 | 7,15 | 31,4 | 49,85 | 54,9 | 4,95 | 114,4 | 33,3 | 127,85 | 28,95 | 17,65 | 20 | 23,15 | 40,5 | 147,65 |
| 230,6 | 20,15 | 42,85 | 25 | 32,05 | 7,5 | 50,6 | 17,4 | 15,1 | 29,2 | 13,95 | 37,8 | 103,25 | 19,75 | 32,9 | 87,55 | 16,7 | 154,35 | 50,85 |
| 158,9 | 52,35 | 136,1 | 88,65 | 15,15 | 32,25 | 5,3 | 6,3 | 5,5 | 45,15 | 17,55 | 148,95 | 24,75 | 120,3 | 63,95 | 25,8 | 15,25 | 80,7 | 54,25 |
| 14 | 100,15 | 56,7 | 20,5 | 14,2 | 17,2 | 3,1 | 52,85 | 10,3 | 86,1 | 48,5 | 21,35 | 76,5 | 25,65 | 27,5 | 21,75 | 40,05 | 413 | 27,5 |
| 21,35 | 24,8 | 86,7 | 30,4 | 8,75 | 44 | 12 | 51 | 12,3 | 32,85 | 22 | 4,4 | 24,8 | 24,55 | 42,25 | 19,85 | 18,6 | 28,55 | 32,3 |
| 59,1 | 47,6 | 11,15 | 65 | 20,9 | 10,5 | 43,75 | 34,25 | 29,65 | 26,7 | 22,6 | 53,15 | 24 | 113,8 | 17,6 | 25,4 | 41 | 52 | 11,25 |
| 83,4 | 14,15 | 366,6 | 71,8 | 6,4 | 42,7 | 20,1 | 70,5 | 35,35 | 16,85 | 42,65 | 56,25 | 38,55 | 48,8 | 54,4 | 16,4 | 32,4 | 32,95 | 70,5 |
| 13,1 | 10,95 | 31 | 17,25 | 9,55 | 6,6 | 4,4 | 25,35 | 22,95 | 7,65 | 96 | 17 | 36,5 | 55,05 | 11,15 | 10,8 | 11,4 | 25 | 25,15 |
| 82,1 | 20,75 | 48 | 277,6 | 33,85 | 15,9 | 21,85 | 46,15 | 21,25 | 57,35 | 77,8 | 11,35 | 70,45 | 23,4 | 29,7 | 27,7 | 53,5 | 124 | 20,25 |
| 34,55 | 30,25 | 106,55 | 70,8 | 16,6 | 92,7 | 8,4 | 41,9 | 8,5 | 49,75 | 141,35 | 35,4 | 41 | 20,3 | 22,45 | 21,4 | 217,5 | 185,25 | 45,65 |
| 69,3 | 9,15 | 38,4 | 110,75 | 30,5 | 16,85 | 33,65 | 12,5 | 51,75 | 49,4 | 40,8 | 13,9 | 221,4 | 120,4 | 6,65 | 23,5 | 43,4 | 29,45 | 18 |
| 275,9 | 15,25 | 75,25 | 47,2 | 37,65 | 13,85 | 29,25 | 16,35 | 10,75 | 50,2 | 24,5 | 11,6 | 37,85 | 97,1 | 9 | 30,45 | 62,15 | 60,35 | 24,65 |
| 154,1 | 22 | 28,25 | 62,85 | 9,45 | 13,4 | 71,25 | 18,75 | 29,8 | 14,75 | 51,5 | 15,85 | 225,05 | 76,9 | 16,15 | 23 | 29 | 29,05 | 54,8 |
| 73,5 | 318,15 | 19,75 | 111,35 | 20,65 | 1,7 | 0,5 | 11,8 | 18,25 | 72,45 | 16,55 | 108,35 | 54,85 | 57,3 | 13 | 11,9 | 20 | 43,3 | |
| 5,9 | 7,65 | 14,3 | 53,7 | 45 | 5,6 | 1,65 | 23,4 | 23,75 | 19 | 81,15 | 12,3 | 23,55 | 8,65 | 11,7 | 27,8 | 165 | 43,7 | |
| 48,25 | 35,15 | 19,1 | 10,8 | 10,25 | 22 | 5,5 | 69,45 | 32,75 | 47,2 | 37,45 | 42,75 | 77,3 | 5,1 | 11,25 | 4,65 | 105 | 29,6 | |
| 323,7 | 107 | 314,85 | 56,8 | 59,2 | 2,6 | 12 | 37 | 38,75 | 10,65 | 26,7 | 50,2 | 11,7 | 48,9 | 96,4 | 18,75 | 91,2 | 39,2 | |

Lampiran 2 : *Time to Repair*

| 2301 | | | | | | | | | | | | | | | | | | |
|-------|--------|---------|-------|-------|---------|------|-------|-------|------|------|-------|--------|---------|-------|-------|-------|------|--------|
| 0,60 | 4,00 | 0,50 | 0,40 | 0,50 | 0,40 | 0,20 | 2,00 | 5,23 | 1,75 | 1,72 | 0,33 | 2,50 | 1,00 | 0,28 | 22,17 | 10,83 | 0,58 | 0,40 |
| 0,83 | 3,82 | 1655,25 | 0,75 | 0,50 | 0,33 | 0,12 | 0,53 | 1,13 | 0,33 | 0,77 | 0,47 | 1,17 | 0,30 | 0,42 | 4,33 | 0,30 | 0,20 | 0,30 |
| 1,00 | 0,50 | 1,60 | 6,30 | 0,10 | 1,70 | 0,70 | 0,50 | 0,80 | 0,60 | 8,60 | 0,40 | 2,20 | 0,70 | 0,80 | 2,10 | 2,00 | 5,00 | 0,30 |
| 1,50 | 0,40 | 0,20 | 5,00 | 0,50 | 7,40 | 0,50 | 2,10 | 0,30 | 3,00 | 1,80 | 0,30 | 0,30 | 5,20 | 62,70 | 8,00 | 1,00 | 0,30 | 1,80 |
| 1,30 | 0,50 | 1,00 | 1,10 | 0,30 | 1,70 | 3,10 | 0,80 | 0,10 | 3,30 | 3,00 | 0,30 | 0,10 | 0,80 | 0,10 | 4,30 | 0,70 | 3,90 | 3,00 |
| 1,70 | 1,80 | 0,30 | 0,30 | 0,80 | 3,30 | 0,40 | 0,80 | 0,30 | 0,50 | 0,30 | 1,50 | 0,80 | 0,20 | 0,50 | 0,30 | 1,00 | 2,50 | 1,10 |
| 7,30 | 0,50 | 2,00 | 0,20 | 0,20 | 0,20 | 0,50 | 0,80 | 1,90 | 0,40 | 2,50 | 1,30 | 3,00 | 0,50 | 0,50 | 1,60 | 1,20 | 3,80 | 6,90 |
| 0,50 | 0,70 | 6,00 | 0,50 | 0,90 | 3,00 | 4,00 | 0,60 | 0,70 | 0,50 | 0,50 | 44,70 | 1,00 | 1,60 | 1,40 | 2,90 | 0,50 | 1,30 | 16,00 |
| 0,50 | 0,50 | 4,90 | 1,50 | 0,90 | 1,00 | 0,30 | 0,70 | 0,90 | 0,20 | 0,50 | 0,30 | 1,20 | 0,30 | 1,90 | 0,20 | 1,00 | 2,10 | 0,20 |
| 0,50 | 0,40 | 0,20 | 2,80 | 1,10 | 0,80 | 0,40 | 2,80 | 3,00 | 0,80 | 0,10 | 0,10 | 6,40 | 0,50 | 2,50 | 7,90 | 0,30 | 1,00 | 4,30 |
| 1,00 | 1,30 | 36,50 | 1,90 | 1,60 | 0,30 | 5,60 | 0,50 | 3,00 | 0,50 | 2,00 | 0,10 | 1,10 | 1,10 | 23,00 | 0,80 | 2,90 | 0,40 | 1,60 |
| 2,50 | 3,50 | 0,30 | 0,50 | 1,40 | 1,90 | 0,40 | 0,50 | 26,90 | 4,00 | 0,10 | 0,60 | 0,70 | 0,50 | 0,20 | 2,50 | 2,50 | 0,10 | 5,30 |
| 7,80 | | | | | | | | | | | | | | | | | | |
| 2302 | | | | | | | | | | | | | | | | | | |
| 0,60 | 1,45 | 0,80 | 0,83 | 1,30 | 4,80 | 0,80 | 0,70 | 0,20 | 1,30 | 0,40 | 0,40 | 3,20 | 0,80 | 2,00 | 0,40 | 0,20 | 0,20 | 0,20 |
| 7,83 | 0,77 | 0,30 | 1,40 | 1,50 | 0,70 | 0,20 | 0,50 | 0,20 | 0,30 | 0,20 | 1,60 | 1,90 | 0,90 | 0,20 | 9,10 | 1,20 | 0,50 | 0,20 |
| 0,47 | 0,28 | 0,92 | 3,50 | 5,50 | 0,50 | 3,20 | 59,50 | 0,50 | 0,30 | 0,80 | 0,40 | 0,70 | 4324,10 | 4,00 | 0,20 | 0,30 | 1,10 | 242,40 |
| 0,22 | 1,83 | 5,17 | 13,40 | 1,30 | 0,60 | 3,40 | 0,80 | 4,40 | 0,10 | 0,20 | 5,80 | 0,20 | 6,90 | 2,00 | 0,50 | 2,20 | 0,40 | 0,20 |
| 3,17 | 1,50 | 0,75 | 24,00 | 0,40 | 74,40 | 0,20 | 0,10 | 0,70 | 1,20 | 2,60 | 0,20 | 0,50 | 2,00 | 1,60 | 0,20 | 0,60 | 1,80 | 1,30 |
| 2,40 | 0,35 | 2,42 | 8,50 | 1,40 | 1,10 | 0,20 | 1,80 | 0,60 | 9,10 | 5,20 | 4,40 | 0,40 | 1,00 | 2,60 | 0,40 | 0,50 | 1,00 | 0,60 |
| 1,00 | 0,33 | 6,50 | 0,67 | 0,20 | 0,40 | 0,40 | 0,60 | 0,80 | 0,10 | 0,50 | 0,30 | 1,40 | 5,00 | 0,90 | 5,00 | 3,10 | 0,80 | 4,00 |
| 0,63 | 1,65 | 0,46 | 0,25 | 0,50 | 1,40 | 0,90 | 1,90 | 0,20 | 1,30 | 0,80 | 0,90 | 0,80 | 0,80 | 2,70 | 0,70 | 1,80 | 0,50 | 39,60 |
| 1,50 | 2,97 | 0,70 | 0,33 | 1,40 | 0,70 | 0,20 | 1,10 | 0,50 | 0,50 | 0,70 | 0,10 | 456,90 | 4,10 | 1,00 | 0,20 | 0,30 | 0,10 | |
| 1,75 | 0,47 | 0,20 | 0,40 | 0,40 | 0,30 | 0,50 | 0,20 | 1,90 | 0,50 | 1,40 | 0,40 | 1,20 | 0,40 | 0,50 | 0,90 | 8,80 | 0,20 | |
| 2,57 | 1,00 | 0,30 | 2,10 | 0,80 | 6,70 | 0,30 | 0,90 | 0,20 | 1,80 | 0,30 | 7,20 | 0,20 | 4,60 | 0,90 | 1,60 | 0,90 | 0,50 | |
| 0,93 | 2,17 | 0,58 | 0,50 | 0,40 | 5763,00 | 0,20 | 0,90 | 0,30 | 0,80 | 0,40 | 64,20 | 0,80 | 0,40 | 1,70 | 0,80 | 1,50 | 0,30 | |
| 0,50 | 1,25 | 2,17 | 1,20 | 0,20 | 0,20 | 0,80 | 1,50 | 0,20 | 0,90 | 7,10 | 6,10 | 3,20 | 22,20 | 0,20 | 51,70 | 0,80 | 0,20 | |
| 0,20 | 2,38 | 0,65 | 2,30 | 0,40 | 6,20 | 0,10 | 0,50 | 0,10 | 0,50 | 0,40 | 0,20 | 1,90 | 5,40 | 1,70 | 59,00 | 0,80 | 0,70 | |
| 4,12 | 196,90 | 3,42 | 0,70 | 0,30 | 1,00 | 0,10 | 0,20 | 1,00 | 1,00 | 8,10 | 0,20 | 0,70 | 2,40 | 0,20 | 0,30 | 0,70 | 6,10 | |
| 12,00 | 0,25 | 0,17 | 1,00 | 0,30 | 2,50 | 0,30 | 0,50 | 1,70 | 0,40 | 0,20 | 3,60 | 0,20 | 0,70 | 0,20 | 0,50 | 7,00 | 0,20 | |
| 0,53 | 6,80 | 0,82 | 0,60 | 0,10 | 1,50 | 0,10 | 1,30 | 9,10 | 0,20 | 6,10 | 1,20 | 0,50 | 2,20 | 3,30 | 0,50 | 3,40 | 0,90 | |
| 0,88 | 8,33 | 0,68 | 1,00 | 0,50 | 0,20 | 0,20 | 1,20 | 24,00 | 1,20 | 0,80 | 0,20 | 0,40 | 68,00 | 0,20 | 0,60 | 0,30 | 0,20 | |
| 0,23 | 0,57 | 0,33 | 1,50 | 22,00 | 1,40 | 3,00 | 0,30 | 10,30 | 2,00 | 1,80 | 0,80 | 1,40 | 0,20 | 4,70 | 0,20 | 0,30 | 1,10 | |

| 2306 | | | | | | | | | | | | | | | | | | |
|--------|-------|------|-------|------|-------|------|------|--------|-------|-------|-------|-------|------|--------|-------|-------|--------|-------|
| 969,60 | 0,40 | 6,50 | 0,10 | 0,10 | 0,40 | 0,20 | 2,10 | 0,20 | 1,20 | 1,70 | 0,20 | 2,40 | 0,30 | 18,10 | 0,80 | 0,90 | 0,70 | 0,90 |
| 1,00 | 1,30 | 3,50 | 1,60 | 1,60 | 1,80 | 8,00 | 2,00 | 6,40 | 1,00 | 1,20 | 4,00 | 1,40 | 5,50 | 0,50 | 0,50 | 2,30 | 0,10 | 3,10 |
| 0,30 | 0,60 | 0,60 | 53,80 | 1,10 | 0,50 | 0,10 | 0,40 | 0,40 | 0,60 | 9,00 | 0,30 | 1,10 | 0,10 | 0,50 | 0,20 | 0,20 | 2,50 | 5,70 |
| 0,30 | 0,30 | 0,10 | 2,00 | 1,50 | 2,00 | 0,20 | 0,30 | 0,10 | 0,30 | 2,10 | 0,90 | 2,80 | 1,20 | 0,50 | 1,30 | 1,80 | 0,80 | 39,70 |
| 1,30 | 0,70 | 0,20 | 0,50 | 0,50 | 0,20 | 0,50 | 0,60 | 1,30 | 0,10 | 0,70 | 0,60 | 1,00 | 1,30 | 0,30 | 1,20 | 0,50 | 5,20 | 0,40 |
| 0,20 | 0,20 | 1,50 | 1,00 | 0,30 | 0,60 | 0,30 | 0,10 | 0,70 | 11,80 | 0,80 | 0,50 | 2,50 | 0,90 | 1,50 | 4,00 | 0,10 | 1,20 | 0,10 |
| 0,90 | 0,20 | 4,30 | 0,20 | 0,90 | 6,40 | 1,00 | 0,70 | 0,60 | 2,10 | 0,30 | 1,20 | 0,20 | 0,50 | 2,90 | 0,50 | 0,40 | 2,80 | 2,50 |
| 7,70 | 1,50 | 0,30 | 0,50 | 1,00 | 0,80 | 0,50 | 0,30 | 2,30 | 0,50 | 0,60 | 0,50 | 0,50 | 1,70 | 0,30 | 1,60 | 30,10 | 1,80 | 0,80 |
| 0,80 | 0,30 | 0,20 | 0,30 | 0,20 | 2,60 | 0,60 | 1,20 | 0,30 | 0,90 | 5,40 | 0,20 | 3,30 | 0,70 | 3,20 | 0,80 | 0,70 | 2,30 | 2,50 |
| 6,10 | 0,60 | 1,00 | 0,20 | 0,20 | 0,60 | 0,50 | 2,70 | 1,80 | 0,90 | 7,80 | 1,30 | 0,70 | 1,00 | 0,60 | 1,90 | 1,40 | 5,30 | 0,50 |
| 3,40 | 31,80 | 0,50 | 0,50 | 1,90 | 9,00 | 5,50 | 0,50 | 0,50 | 0,80 | 0,40 | 0,40 | 0,90 | 2,50 | 3,40 | 0,20 | 0,30 | 1,50 | 0,50 |
| 0,70 | 1,00 | 1,70 | 0,90 | 0,90 | 0,20 | 0,30 | 0,40 | 1,20 | 1,30 | 0,70 | 0,90 | 1,50 | 0,10 | 0,70 | 12,40 | 0,30 | 1,50 | 2,40 |
| 0,70 | 0,20 | 0,90 | 0,40 | 1,40 | 0,20 | 1,30 | 0,20 | 0,70 | 0,20 | 0,30 | 0,80 | 0,30 | 0,20 | 801,70 | 0,30 | 2,50 | 0,20 | 5,40 |
| 0,80 | 1,50 | 0,70 | 1,80 | 0,40 | 1,40 | 1,90 | 1,70 | 0,30 | 1,00 | 1,00 | 0,50 | 0,30 | 4,30 | 0,50 | 8,30 | 6,60 | 106,00 | 1,90 |
| 3,50 | 0,40 | 0,20 | 3,00 | 0,10 | 0,90 | 0,60 | 0,10 | 1,60 | 0,50 | 0,20 | 4,60 | 5,70 | 0,50 | 2,30 | 28,00 | 1,30 | 0,10 | 1,30 |
| 0,40 | 0,50 | 0,20 | 0,50 | 1,20 | 12,00 | 1,10 | 0,10 | 1,40 | 0,80 | 0,30 | 36,40 | 8,00 | 1,50 | 0,50 | 4,00 | 0,50 | 3,10 | |
| 1,00 | 1,30 | 0,60 | 0,50 | 0,60 | 0,70 | 1,90 | 0,90 | 1,70 | 0,20 | 1,50 | 28,40 | 0,90 | 0,40 | 2,90 | 0,50 | 2,90 | 1,10 | |
| 0,20 | 0,50 | 3,20 | 3,10 | 4,40 | 0,20 | 0,30 | 3,20 | 21,10 | 0,20 | 3,80 | 0,80 | 0,90 | 0,80 | 0,30 | 1,60 | 1,20 | 0,60 | |
| 0,40 | 0,70 | 0,20 | 0,40 | 1,50 | 0,40 | 0,90 | 0,30 | 2,20 | 1,00 | 1,40 | 1,40 | 2,00 | 0,30 | 6,00 | 0,80 | 0,50 | 63,30 | |
| 1,20 | 0,70 | 0,10 | 0,30 | 0,70 | 0,50 | 1,10 | 0,10 | 0,40 | 3,50 | 1,00 | 0,20 | 1,50 | 3,50 | 0,20 | 1,90 | 0,10 | 0,50 | |
| 1,00 | 0,30 | 1,20 | 1,30 | 0,70 | 0,60 | 0,20 | 0,10 | 0,20 | 0,20 | 19,10 | 0,60 | 26,50 | 2,30 | 0,80 | 0,20 | 1,00 | 0,50 | |
| 0,20 | 0,50 | 1,00 | 0,50 | 0,70 | 0,30 | 3,40 | 1,70 | 1,20 | 1,60 | 2,00 | 0,30 | 0,30 | 1,00 | 0,70 | 12,40 | 69,30 | 0,80 | |
| 2,80 | 0,60 | 0,30 | 0,70 | 0,60 | 0,30 | 1,30 | 0,10 | 2,00 | 0,40 | 14,10 | 0,20 | 1,20 | 0,30 | 1,00 | 0,30 | 0,40 | 0,50 | |
| 0,50 | 0,40 | 4,70 | 0,30 | 0,20 | 1,10 | 0,40 | 0,50 | 1,80 | 0,10 | 2,00 | 0,80 | 4,90 | 2,80 | 1,10 | 8,30 | 1,60 | 0,70 | |
| 0,20 | 0,40 | 2,30 | 1,60 | 0,50 | 0,90 | 6,60 | 0,20 | 0,90 | 2,10 | 0,90 | 1,00 | 1,00 | 1,00 | 0,30 | 0,60 | 2,40 | 1,30 | |
| 1,10 | 0,80 | 0,40 | 3,50 | 0,80 | 1,50 | 4,50 | 0,10 | 843,90 | 7,30 | 0,40 | 0,20 | 0,20 | 0,80 | 0,50 | 0,30 | 1,90 | 0,50 | |

| 2472 | | | | | | | | | | | | | | | | | | |
|------|------|-------|-------|------|------|-------|------|-------|-------|------|------|------|------|-------|------|------|------|------|
| 1,60 | 0,30 | 6,30 | 67,70 | 3,27 | 0,10 | 0,50 | 1,10 | 74,50 | 0,80 | 0,50 | 6,30 | 0,50 | 0,80 | 15,10 | 3,20 | 0,90 | 0,30 | 1,60 |
| 2,30 | 0,30 | 1,40 | 0,60 | 5,00 | 1,40 | 13,10 | 1,60 | 0,30 | 96,70 | 0,50 | 0,90 | 0,20 | 3,80 | 1,20 | 1,80 | 3,90 | 0,30 | 1,50 |
| 0,60 | 0,50 | 6,40 | 0,10 | 0,30 | 0,20 | 1,40 | 4,10 | 0,10 | 0,50 | 2,00 | 1,20 | 0,30 | 0,50 | 1,10 | 1,30 | 2,50 | 1,50 | 4,40 |
| 2,00 | 0,10 | 0,50 | 1,10 | 0,20 | 0,50 | 0,30 | 3,00 | 3,30 | 0,40 | 5,20 | 1,10 | 0,90 | 4,10 | 1,20 | 3,20 | 4,40 | 1,30 | 0,50 |
| 5,00 | 1,40 | 13,10 | 1,60 | 0,30 | 0,30 | 1,50 | 1,30 | 0,20 | 0,10 | 0,90 | 1,30 | 6,60 | 1,30 | 2,10 | 2,30 | 0,10 | 0,50 | 0,50 |
| 0,30 | 0,20 | 1,40 | 4,10 | 0,30 | 6,30 | 67,70 | 3,27 | 0,70 | 16,40 | 0,10 | 8,30 | 1,50 | 0,20 | 0,50 | 0,10 | 0,30 | 6,40 | 0,70 |
| 0,20 | 0,50 | 0,30 | 3,00 | 0,30 | 1,40 | 0,60 | 5,40 | 0,10 | 1,00 | 0,10 | 4,10 | 0,20 | 0,50 | 5,40 | 0,40 | 0,50 | 0,10 | 0,70 |
| 0,50 | 5,60 | | | | | | | | | | | | | | | | | |

| 2307 | | | | | | | | | | | | | | | | | | |
|-------|------|------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|------|-------|-------|------|------|--------|
| 2,12 | 3,07 | 0,37 | 0,40 | 2,53 | 0,75 | 1,42 | 0,10 | 0,30 | 1,70 | 0,70 | 2,80 | 0,60 | 0,40 | 3,60 | 0,60 | 0,90 | 0,50 | 4,20 |
| 3,00 | 1,07 | 0,32 | 0,50 | 1,03 | 6,25 | 0,40 | 0,60 | 1,00 | 5,20 | 1,00 | 0,60 | 23,40 | 2,10 | 0,50 | 1,10 | 0,10 | 0,50 | 4,80 |
| 0,25 | 0,43 | 1,37 | 7,10 | 0,77 | 1,08 | 0,40 | 1,20 | 0,40 | 0,60 | 0,70 | 0,50 | 0,50 | 0,30 | 5,60 | 6,40 | 0,10 | 0,50 | 1,00 |
| 0,25 | 2,50 | 0,83 | 1,10 | 1,10 | 0,33 | 0,30 | 0,30 | 0,50 | 0,40 | 5,80 | 0,30 | 0,30 | 1,50 | 0,20 | 0,90 | 0,50 | 1,00 | 0,20 |
| 0,28 | 0,30 | 0,33 | 2,40 | 4,40 | 0,50 | 2,00 | 2,60 | 1,70 | 0,10 | 0,50 | 0,20 | 2,60 | 1,30 | 0,30 | 0,50 | 1,80 | 3,40 | 0,30 |
| 0,50 | 0,08 | 0,17 | 2,10 | 1,30 | 0,33 | 0,50 | 0,50 | 2,00 | 1,10 | 1,30 | 0,20 | 0,60 | 0,80 | 0,60 | 0,30 | 0,50 | 0,80 | 1,40 |
| 2,65 | 0,27 | 1,15 | 0,10 | 0,80 | 0,33 | 0,60 | 1,40 | 3,60 | 0,30 | 0,10 | 0,40 | 7,30 | 2,50 | 0,80 | 17,20 | 0,50 | 2,30 | 0,30 |
| 9,50 | 0,52 | 0,80 | 0,70 | 0,37 | 0,80 | 3,00 | 0,20 | 0,20 | 4,30 | 0,50 | 0,30 | 1,20 | 0,50 | 0,60 | 2,70 | 1,00 | 0,20 | 0,10 |
| 0,98 | 0,67 | 0,80 | 0,90 | 9,00 | 0,28 | 5,50 | 0,30 | 0,30 | 2,20 | 0,80 | 0,50 | 11,50 | 0,50 | 1,00 | 1,40 | 1,70 | 3,70 | 1,70 |
| 1,95 | 1,25 | 0,67 | 1,10 | 0,62 | 0,78 | 4,20 | 1,70 | 0,30 | 0,30 | 0,90 | 0,30 | 1,60 | 5,00 | 0,20 | 1,20 | 0,90 | 0,40 | 2,00 |
| 2,62 | 0,25 | 2,60 | 0,30 | 0,70 | 0,47 | 0,30 | 0,30 | 0,50 | 0,50 | 0,60 | 2,90 | 0,50 | 0,20 | 0,20 | 0,30 | 5,70 | 3,10 | 5,90 |
| 1,55 | 0,33 | 0,60 | 0,40 | 1,30 | 0,92 | 0,20 | 0,80 | 6,00 | 3,00 | 0,20 | 1,20 | 1,90 | 0,50 | 0,20 | 5,50 | 0,50 | 0,10 | 5,80 |
| 3,28 | 3,50 | 0,75 | 12,80 | 0,75 | 1,68 | 0,90 | 2,30 | 0,20 | 4,10 | 4,50 | 10,60 | 1,00 | 3,40 | 1,50 | 2,30 | 0,30 | 1,60 | 0,80 |
| 0,43 | 2,37 | 0,25 | 3,30 | 5,50 | 4,57 | 67,10 | 0,20 | 0,70 | 0,10 | 2,00 | 1,30 | 1,30 | 0,30 | 0,90 | 1,90 | 2,50 | 0,40 | 4,60 |
| 0,13 | 4,50 | 0,75 | 0,30 | 13,47 | 8,00 | 0,60 | 0,70 | 4,00 | 0,30 | 0,20 | 0,20 | 0,30 | 0,50 | 0,50 | 1,40 | 1,40 | 1,70 | 0,70 |
| 47,00 | 0,43 | 2,70 | 1,20 | 1,73 | 8,17 | 36,70 | 0,20 | 0,10 | 0,30 | 4,40 | 0,40 | 2,40 | 6,00 | 3,70 | 1,00 | 0,90 | 0,20 | 2,00 |
| 2,87 | 0,48 | 0,90 | 0,20 | 2,27 | 0,43 | 9,80 | 0,20 | 2,30 | 1,00 | 0,50 | 0,20 | 5,00 | 0,10 | 1,00 | 1,00 | 0,50 | 6,00 | 0,50 |
| 5,75 | 0,25 | 1,17 | 1,60 | 0,38 | 0,83 | 0,50 | 0,30 | 13,80 | 0,70 | 1,30 | 1,80 | 2,10 | 2,70 | 1,30 | 0,70 | 1,60 | 2,70 | 1,70 |
| 3,25 | 0,22 | 0,50 | 1,40 | 1,95 | 0,58 | 0,40 | 0,80 | 0,30 | 1,80 | 0,20 | 0,40 | 1,70 | 2,50 | 0,40 | 1,20 | 1,00 | 0,80 | 29,50 |
| 3,22 | 1,50 | 0,20 | 0,80 | 2,67 | 0,78 | 0,30 | 0,20 | 0,40 | 0,40 | 0,30 | 2,00 | 2,10 | 6,20 | 0,30 | 0,50 | 0,60 | 1,30 | 2,80 |
| 5,33 | 0,67 | 1,80 | 6,20 | 0,28 | 0,13 | 0,50 | 5,20 | 0,20 | 0,80 | 2,80 | 0,40 | 1,40 | 0,20 | 2,30 | 2,00 | 1,50 | 2,30 | 8,00 |
| 4,00 | 0,45 | 1,00 | 10,33 | 0,45 | 56,83 | 0,50 | 1,50 | 2,60 | 0,50 | 5,80 | 4,30 | 1,00 | 6,60 | 15,30 | 0,50 | 1,60 | 2,50 | 1,50 |
| 1,33 | 1,18 | 1,30 | 0,25 | 1,00 | 2,50 | 0,90 | 0,20 | 0,10 | 9,00 | 1,80 | 1,20 | 0,70 | 0,20 | 2,70 | 17,00 | 1,00 | 6,60 | 4,00 |
| 9,97 | 1,33 | 0,40 | 1,00 | 0,50 | 2,47 | 0,50 | 14,70 | 0,80 | 2,50 | 0,30 | 1,30 | 0,60 | 0,50 | 0,70 | 0,30 | 0,20 | 6,40 | 0,90 |
| 0,92 | 0,35 | 0,80 | 11,08 | 5,08 | 0,33 | 0,80 | 4,00 | 32,20 | 0,50 | 1,30 | 0,20 | 2,00 | 6,30 | 20,70 | 0,50 | 0,30 | 2,40 | 3,30 |
| 1,00 | 0,27 | 5,50 | 18,00 | 1,00 | 7,40 | 1,20 | 0,10 | 0,20 | 0,90 | 0,30 | 3,30 | 0,60 | 0,20 | 2,50 | 65,80 | 0,30 | 0,50 | 946,70 |
| 0,50 | 4,17 | 2,70 | 24,00 | 2,33 | 1,17 | 2,30 | 0,20 | 31,00 | 1,10 | 0,40 | 0,10 | 0,50 | 1,20 | 1,60 | 0,20 | 0,50 | 1,50 | |
| 0,48 | 0,22 | 3,00 | 9,93 | 3,83 | 0,48 | 0,70 | 0,20 | 0,30 | 0,50 | 0,20 | 9,20 | 0,30 | 1,50 | 1,40 | 0,40 | 2,20 | 0,90 | |
| 2,28 | 0,17 | 2,20 | 0,83 | 8,00 | 0,98 | 1,00 | 0,20 | 1,20 | 1,00 | 0,80 | 0,80 | 4,00 | 0,80 | 0,70 | 0,20 | 0,30 | 1,50 | |
| 1,53 | 3,92 | 0,20 | 2,92 | 5,05 | 0,27 | 0,30 | 0,10 | 0,50 | 38,00 | 16,70 | 1,70 | 0,30 | 0,40 | 0,70 | 1,50 | 1,60 | 0,70 | |
| 0,38 | 0,17 | 3,30 | 0,50 | 0,25 | 1,50 | 0,20 | 0,40 | 0,20 | 0,20 | 2,10 | 0,60 | 0,20 | 0,20 | 0,40 | 1,20 | 1,50 | 0,50 | |
| 0,33 | 2,52 | 0,30 | 0,38 | 0,30 | 1,48 | 3,30 | 6,20 | 0,20 | 896,90 | 0,90 | 1,50 | 0,20 | 1,50 | 1,00 | 0,20 | 2,10 | 2,80 | |

| 2469 | | | | | | | | | | | | | | | | | | |
|------|-------|-------|-------|--------|-------|------|-------|-------|-------|------|--------|-------|--------|-------|--------|-------|-------|------|
| 3,00 | 2,60 | 0,20 | 1,50 | 1,40 | 2,00 | 1,10 | 0,70 | 3,00 | 0,30 | 1,50 | 0,20 | 1,10 | 32,60 | 6,50 | 22,60 | 1,80 | 36,10 | 1,30 |
| 9,00 | 22,30 | 0,30 | 3,70 | 0,30 | 0,50 | 1,70 | 3,50 | 13,20 | 0,80 | 0,50 | 0,70 | 0,30 | 0,70 | 0,90 | 3,20 | 0,50 | 0,60 | 0,30 |
| 0,40 | 0,50 | 3,50 | 3,00 | 0,40 | 0,20 | 0,90 | 0,20 | 0,20 | 0,30 | 0,80 | 0,50 | 1,30 | 5,80 | 0,30 | 6,60 | 0,70 | 0,30 | 0,20 |
| 1,40 | 1,60 | 0,40 | 0,30 | 965,10 | 4,10 | 3,60 | 0,80 | 0,60 | 1,00 | 0,70 | 0,30 | 0,80 | 1,30 | 0,40 | 188,20 | 0,70 | 1,50 | 3,40 |
| 1,70 | 0,30 | 0,90 | 2,20 | 0,60 | 11,00 | 0,20 | 0,50 | 0,80 | 0,80 | 1,50 | 0,70 | 4,70 | 0,70 | 5,30 | 0,30 | 0,70 | 0,70 | 1,40 |
| 0,80 | 0,80 | 2,80 | 0,50 | 0,30 | 36,10 | 0,80 | 0,90 | 0,30 | 1,90 | 1,20 | 0,10 | 0,20 | 124,00 | 0,50 | 0,10 | 0,90 | 0,50 | 2,20 |
| 4,40 | 0,50 | 0,30 | 0,20 | 1,30 | 20,50 | 0,30 | 1,40 | 0,50 | 2,80 | 0,20 | 3,90 | 0,40 | 0,50 | 0,20 | 0,10 | 0,80 | 3,10 | |
| 0,50 | 1,00 | 0,40 | 0,30 | 0,20 | 0,70 | 0,90 | 0,30 | 3,30 | 1,20 | 0,80 | 0,50 | 0,90 | 0,30 | 0,80 | 0,30 | 2,40 | 0,70 | |
| 0,40 | 12,10 | 0,20 | 0,10 | 0,80 | 3,00 | 1,10 | 0,50 | 1,20 | 0,60 | 1,20 | 0,20 | 0,80 | 1,00 | 3,10 | 0,20 | 2,50 | 3,00 | |
| 0,60 | 0,40 | 0,20 | 0,10 | 8,60 | 3,30 | 0,50 | 1,10 | 0,30 | 0,80 | 0,60 | 0,80 | 2,40 | 1,00 | 2,00 | 0,20 | 0,20 | 0,30 | |
| 0,30 | 1,40 | 0,40 | 0,30 | 0,30 | 0,60 | 0,70 | 8,00 | 1,80 | 0,20 | 9,40 | 1,50 | 0,40 | 0,90 | 0,50 | 1,90 | 2,20 | 0,20 | |
| 1,70 | 3,50 | 0,60 | 0,40 | 0,80 | 1,70 | 0,30 | 0,60 | 8,40 | 0,30 | 2,30 | 8,00 | 2,10 | 0,60 | 69,80 | 0,30 | 0,40 | 1,20 | |
| 1,00 | 2,20 | 0,40 | 0,10 | 0,70 | 0,30 | 1,30 | 3,80 | 0,70 | 1,00 | 1,50 | 24,00 | 69,80 | 2,70 | 14,90 | 0,30 | 0,80 | 1,30 | |
| 0,50 | 0,50 | 1,20 | 4,10 | 0,20 | 0,50 | 1,40 | 2,00 | 1,30 | 13,70 | 0,60 | 8,40 | 0,20 | 0,20 | 0,30 | 3,70 | 6,00 | 2,20 | |
| 1,00 | 0,50 | 0,30 | 0,90 | 0,30 | 0,50 | 1,00 | 1,50 | 0,20 | 7,00 | 0,30 | 0,30 | 1,40 | 0,20 | 18,80 | 3,00 | 0,70 | 1,60 | |
| 2470 | | | | | | | | | | | | | | | | | | |
| 3,00 | 0,80 | 0,25 | 1,48 | 0,17 | 0,42 | 0,33 | 0,08 | 0,25 | 1,58 | 0,40 | 1,00 | 10,00 | 2,42 | 8,00 | 2,62 | 0,83 | 0,20 | 2,03 |
| 0,20 | 3,00 | 1,05 | 9,08 | 0,48 | 0,50 | 0,73 | 1,25 | 0,48 | 0,25 | 6,65 | 7,67 | 2,03 | 0,82 | 3,47 | 2,00 | 0,43 | 4,00 | 0,22 |
| 1,80 | 0,20 | 1,38 | 0,17 | 0,50 | 0,12 | 7,60 | 0,42 | 1,45 | 1,92 | 4,92 | 0,73 | 11,50 | 0,75 | 0,50 | 4,00 | 1,75 | 1,70 | 0,68 |
| 0,50 | 1,50 | 0,08 | 2,25 | 0,80 | 1,83 | 0,63 | 6,42 | 0,28 | 0,25 | 5,18 | 1,00 | 5,42 | 0,28 | 0,37 | 0,88 | 2,92 | 1,18 | 2,72 |
| 1,30 | 1,40 | 0,33 | 2,20 | 873,25 | 0,25 | 0,95 | 0,33 | 0,22 | 0,17 | 6,42 | 0,20 | 2,00 | 0,47 | 1,50 | 3,50 | 0,92 | 1,17 | 0,47 |
| 1,40 | 5,30 | 0,37 | 0,42 | 0,67 | 0,60 | 0,62 | 1,50 | 6,92 | 0,50 | 0,50 | 0,33 | 3,00 | 6,25 | 0,33 | 0,50 | 8,95 | 3,62 | 0,50 |
| 1,90 | 17,20 | 4,28 | 0,58 | 1,65 | 0,67 | 8,87 | 0,25 | 0,65 | 2,50 | 0,17 | 0,25 | 2,50 | 1,92 | 1,08 | 1,02 | 1,83 | 3,50 | 1,40 |
| 2,10 | 2,10 | 0,25 | 0,50 | 0,48 | 0,50 | 0,25 | 0,20 | 1,25 | 1,83 | 1,20 | 0,83 | 0,43 | 0,62 | 0,50 | 2,08 | 0,08 | 0,57 | 2,77 |
| 3,30 | 3,90 | 16,75 | 1,30 | 0,47 | 2,88 | 2,92 | 8,50 | 4,00 | 6,58 | 1,35 | 0,25 | 0,33 | 2,88 | 0,33 | 2,17 | 4,25 | 2,13 | 7,25 |
| 0,30 | 0,17 | 0,33 | 0,83 | 0,17 | 0,50 | 0,43 | 44,42 | 1,27 | 27,00 | 9,92 | 161,85 | 2,58 | 28,48 | 0,17 | 2,42 | 1,22 | 2,12 | 1,02 |
| 1,20 | 29,15 | 0,08 | 0,17 | 5,05 | 0,50 | 0,15 | 1,10 | 0,92 | 0,90 | 0,17 | 3,90 | 0,17 | 1,68 | 0,25 | 2,92 | 2,45 | 0,70 | 2,50 |
| 0,20 | 7,57 | 4,12 | 2,25 | 0,17 | 0,50 | 2,12 | 0,32 | 1,92 | 0,83 | 1,00 | 1,78 | 0,97 | 0,47 | 0,55 | 1,47 | 0,18 | 8,62 | 2,25 |
| 1,60 | 18,30 | 0,25 | 12,75 | 0,25 | 1,35 | 1,42 | 0,92 | 4,83 | 0,17 | 4,22 | 7,17 | 1,33 | 0,25 | 1,40 | 1,10 | 1,27 | 0,50 | |
| 0,20 | 3,10 | 0,25 | 1,32 | 11,50 | 0,67 | 0,50 | 1,33 | 1,00 | 0,35 | 1,42 | 2,25 | 1,17 | 0,20 | 2,35 | 1,27 | 0,25 | 1,30 | |
| 2,30 | 0,90 | 23,20 | 3,17 | 5,52 | 0,17 | 0,17 | 0,25 | 1,12 | 0,50 | 0,33 | 1,68 | 0,42 | 0,30 | 1,92 | 0,47 | 11,80 | 0,60 | |

| 2471 | | | | | | | | | | | | | | | | | | |
|--------|-------|--------|-------|--------|-------|--------|-------|-------|-------|-------|------|--------|-------|-------|-------|--------|--------|--------|
| 0,20 | 3,40 | 0,10 | 5,00 | 1,90 | 2,30 | 18,20 | 0,50 | 0,50 | 0,20 | 5,37 | 1,00 | 0,10 | 0,20 | 3,00 | 0,50 | 1,40 | 0,20 | 0,88 |
| 0,70 | 3,00 | 0,40 | 0,80 | 0,50 | 2,00 | 1,30 | 3,30 | 4,80 | 2,70 | 5,30 | 1,10 | 0,30 | 0,10 | 2,30 | 9,20 | 0,90 | 0,30 | 0,22 |
| 6,10 | 1,70 | 0,20 | 4,50 | 0,80 | 0,70 | 1,20 | 0,80 | 2,70 | 4,18 | 2,42 | 0,80 | 0,20 | 0,20 | 0,50 | 0,20 | 0,50 | 30,70 | 4,55 |
| 104,80 | 2,00 | 0,80 | 3,60 | 0,20 | 1,30 | 0,70 | 16,70 | 0,40 | 3,50 | 2,50 | 0,60 | 0,50 | 0,70 | 4,10 | 0,20 | 0,10 | 8,00 | 0,33 |
| 0,20 | 4,30 | 0,80 | 0,20 | 0,20 | 0,30 | 0,30 | 1,10 | 0,90 | 0,37 | 0,52 | 0,40 | 1,00 | 0,40 | 1,70 | 0,30 | 0,20 | 0,40 | 0,97 |
| 1,00 | 5,10 | 0,60 | 0,70 | 0,80 | 0,30 | 0,50 | 0,50 | 0,60 | 0,43 | 0,30 | 7,30 | 18,60 | 0,30 | 0,30 | 0,80 | 0,80 | 0,30 | 0,52 |
| 0,10 | 2,80 | 0,50 | 1,00 | 1,70 | 0,50 | 0,80 | 1,00 | 0,20 | 1,00 | 1,17 | 0,30 | 7,70 | 1,90 | 0,40 | 0,20 | 1,00 | 0,50 | 3,00 |
| 1,00 | 3,20 | 0,20 | 1,10 | 0,50 | 1,20 | 7,20 | 1,00 | 0,50 | 0,67 | 0,28 | 2,20 | 6,90 | 1,80 | 0,40 | 2,00 | 0,20 | 0,20 | 1,00 |
| 0,20 | 25,10 | 0,20 | 1,00 | 1,10 | 1,60 | 10,50 | 0,60 | 0,10 | 1,25 | 0,23 | 0,80 | 506,70 | 4,00 | 0,10 | 0,30 | 0,20 | 8,50 | 3,33 |
| 4,80 | 0,20 | 0,30 | 0,50 | 5,70 | 20,00 | 0,20 | 0,30 | 2,90 | 4,50 | 1,17 | 0,30 | 0,40 | 1,10 | 0,30 | 0,70 | 6,30 | 0,40 | 2,83 |
| 0,30 | 0,20 | 4,00 | 0,90 | 1,00 | 9,30 | 0,90 | 1,30 | 0,20 | 0,25 | 3,33 | 1,50 | 2,50 | 0,80 | 0,20 | 0,20 | 0,30 | 0,30 | 8,50 |
| 0,30 | 0,20 | 1,00 | 0,20 | 0,20 | 1,00 | 0,80 | 0,20 | 1,00 | 3,20 | 2,52 | 0,50 | 1,30 | 0,40 | 0,30 | 0,30 | 0,10 | 0,10 | 0,40 |
| 0,40 | 1,60 | 0,20 | 0,60 | 1,20 | 1,78 | 0,50 | 1,40 | 0,70 | 8,70 | 0,50 | 0,20 | 0,70 | 0,20 | 0,30 | 0,50 | 0,30 | 16,00 | 0,43 |
| 0,30 | 0,30 | 0,20 | 0,70 | 0,50 | 0,90 | 6,00 | 1,70 | 1,60 | 1,60 | 1,50 | 0,80 | 0,80 | 2,80 | 0,20 | 2,00 | 1,30 | 7,10 | 198,25 |
| 2,10 | 0,20 | 0,20 | 1,00 | 0,40 | 0,20 | 0,20 | 0,40 | 14,10 | 3,60 | 3,33 | 2,40 | 0,60 | 10,90 | 0,10 | 1,00 | 1,50 | 1,20 | 2,17 |
| 4,80 | 0,50 | 0,20 | 0,30 | 0,20 | 0,80 | 0,20 | 48,20 | 0,10 | 0,73 | 0,17 | 1,40 | 0,30 | 0,70 | 0,60 | 0,20 | 0,20 | 176,00 | 0,83 |
| 0,30 | 0,20 | 1,00 | 3,30 | 0,50 | 0,40 | 0,50 | 0,50 | 0,40 | 1,28 | 56,87 | 0,20 | 0,50 | 0,20 | 1,10 | 17,40 | 1,50 | 0,58 | 2,52 |
| 0,30 | 0,20 | 0,70 | 0,30 | 0,80 | 0,60 | 0,30 | 0,10 | 26,00 | 0,50 | 0,17 | 0,10 | 0,30 | 0,20 | 25,00 | 0,70 | 1,70 | 0,08 | 1,53 |
| 0,70 | 0,90 | 1,20 | 2,30 | 2,50 | 0,50 | 0,50 | 0,70 | 1,30 | 3,50 | 51,37 | 0,30 | 0,20 | 0,30 | 0,30 | 0,40 | 5,30 | 49,40 | 0,80 |
| 0,20 | 17,00 | 0,30 | 0,20 | 0,30 | 0,50 | 1,10 | 4,40 | 2,60 | 0,63 | 2,25 | 0,90 | 2,20 | 2,30 | 0,50 | 2,10 | 0,50 | 0,33 | 2,43 |
| 0,90 | 0,70 | 2,30 | 0,30 | 300,10 | 0,30 | 0,90 | 1,30 | 0,20 | 0,67 | 1,80 | 2,20 | 0,20 | 0,20 | 7,10 | 1,00 | 1,10 | 3,00 | 0,17 |
| 0,42 | 2,00 | 0,30 | 0,20 | 0,20 | 2,60 | 0,40 | 2,90 | 1,30 | 16,00 | 2,32 | 6,00 | 2,40 | 0,80 | 0,20 | 0,90 | 1,00 | 0,17 | 0,42 |
| 2,45 | 2,10 | 511,00 | 1,00 | 2,60 | 0,90 | 1,00 | 0,60 | 4,30 | 9,00 | 37,92 | 0,50 | 1,50 | 4,30 | 0,30 | 0,50 | 0,10 | 1,52 | |
| 0,30 | 0,90 | 1,50 | 1,00 | 0,10 | 6,80 | 1,10 | 0,50 | 8,70 | 1,00 | 3,83 | 0,30 | 1,00 | 0,90 | 2,30 | 4,70 | 0,60 | 0,32 | |
| 0,30 | 0,60 | 0,60 | 4,60 | 0,40 | 2,00 | 121,80 | 4,20 | 2,20 | 1,30 | 0,10 | 1,10 | 2,30 | 19,50 | 1,60 | 0,30 | 0,90 | 2,67 | |
| 1,20 | 0,70 | 1,30 | 1,30 | 2,10 | 1,30 | 1,20 | 1,20 | 0,70 | 1,00 | 1,50 | 2,00 | 0,60 | 0,20 | 0,90 | 5,70 | 212,90 | 0,48 | |
| 0,50 | 0,80 | 1,00 | 1,30 | 0,60 | 0,60 | 1,40 | 0,60 | 0,20 | 0,33 | 0,30 | 0,50 | 1,70 | 5,50 | 0,20 | 1,50 | 1,20 | 14,42 | |
| 0,40 | 0,30 | 0,40 | 0,80 | 0,40 | 2,30 | 0,90 | 1,00 | 2,50 | 0,58 | 0,30 | 1,20 | 0,30 | 0,20 | 0,70 | 0,30 | 0,50 | 2,83 | |
| 3,50 | 0,40 | 0,30 | 0,20 | 0,20 | 2,30 | 0,50 | 0,20 | 5,30 | 0,35 | 0,40 | 0,40 | 9,30 | 0,20 | 0,70 | 0,50 | 0,80 | 0,57 | |
| 0,20 | 0,60 | 2,00 | 1,10 | 0,30 | 0,10 | 7,30 | 5,30 | 4,60 | 3,13 | 2,60 | 0,80 | 2,00 | 0,40 | 0,60 | 0,30 | 7,50 | 0,47 | |
| 0,30 | 8,50 | 0,80 | 3,50 | 3,20 | 0,20 | 0,40 | 0,50 | 1,50 | 0,25 | 0,10 | 0,50 | 12,90 | 0,70 | 0,30 | 0,20 | 0,30 | 0,55 | |
| 1,20 | 0,30 | 0,50 | 40,40 | 2,00 | 1,30 | 1,80 | 0,90 | 1,20 | 0,37 | 0,90 | 0,40 | 0,30 | 7,00 | 0,20 | 0,70 | 8,80 | 0,75 | |
| 0,20 | 0,10 | 0,30 | 0,70 | 1,00 | 0,30 | 0,30 | 2,30 | 9,30 | 5,92 | 1,30 | 0,60 | 1,80 | 10,50 | 0,50 | 0,70 | 0,40 | 0,25 | |

| 2473 | | | | | | | | | | | | | | | | | | |
|-------|------|------|-------|-------|-------|------|------|------|------|--------|------|------|------|-------|------|--------|--------|-------|
| 13,50 | 5,00 | 1,90 | 0,30 | 0,10 | 17,00 | 0,50 | 0,50 | 1,20 | 1,00 | 1,70 | 0,60 | 0,60 | 3,10 | 1,80 | 1,40 | 3,30 | 104,30 | 0,30 |
| 5,10 | 1,40 | 3,00 | 20,70 | 0,70 | 2,90 | 0,40 | 0,50 | 0,20 | 0,50 | 0,60 | 0,30 | 1,00 | 2,00 | 57,40 | 1,50 | 3,00 | 1,00 | 1,50 |
| 0,80 | 0,80 | 0,10 | 0,30 | 2,50 | 1,00 | 2,80 | 1,00 | 1,00 | 0,70 | 1,00 | 2,20 | 3,00 | 0,90 | 1,10 | 0,30 | 4,30 | 0,50 | 0,20 |
| 0,30 | 6,20 | 0,70 | 0,50 | 78,40 | 1,50 | 0,20 | 0,50 | 0,70 | 6,00 | 113,80 | 0,50 | 0,10 | 2,50 | 1,00 | 3,00 | 115,90 | 14,80 | 42,50 |
| 0,20 | 1,30 | 0,60 | 0,20 | 2,50 | | | | | | | | | | | | | | |

| 2474 | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|-------|------|-------|------|-------|------|-------|------|------|------|------|------|
| 0,80 | 0,40 | 0,90 | 0,20 | 0,30 | 0,30 | 0,50 | 2,30 | 1,50 | 0,50 | 1,00 | 0,20 | 0,20 | 1,00 | 0,50 | 0,30 | 0,50 | 4,40 | 3,80 |
| 0,40 | 0,50 | 1,80 | 0,20 | 5,60 | 0,20 | 0,30 | 1,40 | 0,30 | 12,00 | 0,30 | 7,10 | 0,50 | 11,20 | 0,20 | 0,40 | 9,60 | 0,50 | 3,00 |
| 0,30 | 0,10 | 2,30 | 0,40 | 6,60 | 1,00 | 3,00 | 0,30 | 0,50 | 8,00 | 4,00 | 26,80 | 0,30 | 2,70 | 5,50 | 2,80 | 8,00 | 3,30 | 9,80 |
| 1,00 | 0,30 | 0,10 | 0,50 | 0,50 | 0,30 | 0,20 | 13,40 | 0,50 | 0,20 | 0,20 | 1,00 | 4,50 | 0,60 | 0,60 | 1,00 | 0,50 | 3,70 | 0,30 |
| 6,90 | 0,80 | 1,30 | 0,30 | 0,50 | 0,20 | 0,40 | 0,20 | 8,00 | | | | | | | | | | |

Lampiran 3 : Biaya Optimal *Grouping Maintenance* Komatsu

| k | No. | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1) |
|---|-----|---|---------|-------|-------------|-------------|
| 1 | 1 | g1 = [2469, 2470, 2471, 2472, 2473, 2474] | 1,2485 | 0,988 | Rp2.009.350 | Rp2.009.351 |

| k | No | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2) |
|---|----|-------------------------------------|---------|--------|-------------|---------------|
| 2 | 1 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.925.685 |
| | | g2 = [2470, 2471, 2472, 2473, 2474] | 1,2273 | 1,2530 | Rp1.625.290 | |
| | 2 | g1 = [2469, 2470] | 1,2390 | 0,7064 | Rp548.721 | Rp2.009.105 |
| | | g2 = [2471, 2472, 2473, 2474] | 1,2530 | 1,1126 | Rp1.460.384 | |
| | 3 | g1 = [2469, 2470, 2471] | 1,2426 | 0,6658 | Rp777.048 | Rp1.996.489 |
| | | g2 = [2472, 2473, 2474] | 1,2531 | 1,2254 | Rp1.219.441 | |
| | 4 | g1 = [2469, 2470, 2471, 2472] | 1,2399 | 0,8227 | Rp1.070.928 | Rp2.058.449 |
| | | g2 = [2473, 2474] | 1,2760 | 1,0879 | Rp987.522 | |
| | 5 | g1 = [2469, 2470, 2471, 2472, 2473] | 1,2475 | 0,9058 | Rp1.661.685 | Rp1.990.849 |
| | | g2 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |

| k | No. | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2, tg3) |
|---|-----|-------------------------------|---------|--------|-------------|--------------------|
| 3 | 1 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.995.500 |
| | | g2 = [2470] | 1,1682 | 1,6773 | Rp234.721 | |
| | | g3 = [2471, 2472, 2473, 2474] | 1,253 | 1,1260 | Rp1.460.384 | |
| | 2 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.994.348 |
| | | g2 = [2470, 2471] | 1,2081 | 1,0145 | Rp474.513 | |
| | | g3 = [2472, 2473, 2474] | 1,2531 | 1,2254 | Rp1.219.441 | |
| | 3 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp2.034.489 |
| | | g2 = [2470, 2471, 2472] | 1,2113 | 1,1701 | Rp746.573 | |
| | | g3 = [2473, 2474] | 1,276 | 1,0879 | Rp987.522 | |
| | 4 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.927.134 |
| | | g2 = [2470, 2471, 2472, 2473] | 1,2241 | 1,1810 | Rp1.297.575 | |
| | | g3 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 5 | g1 = [2469, 2470] | 1,239 | 0,7064 | Rp548.721 | Rp1.995.561 |
| | | g2 = [2471] | 1,2332 | 0,7863 | Rp227.399 | |
| | | g3 = [2472, 2473, 2474] | 1,2531 | 1,2254 | Rp1.219.441 | |
| | 6 | g1 = [2469, 2470] | 1,239 | 0,7064 | Rp548.721 | Rp2.049.055 |
| | | g2 = [2471, 2472] | 1,232 | 1,0694 | Rp512.812 | |
| | | g3 = [2473, 2474] | 1,276 | 1,0879 | Rp987.522 | |
| | 7 | g1 = [2469, 2470] | 1,239 | 0,7064 | Rp548.721 | Rp1.981.024 |
| | | g2 = [2471, 2472, 2473] | 1,2488 | 1,0530 | Rp1.103.138 | |
| | | g3 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 8 | g1 = [2469, 2470, 2471] | 1,2426 | 0,6658 | Rp777.048 | Rp2.028.041 |
| | | g2 = [2472] | 1,2056 | 1,7145 | Rp263.471 | |
| | | g3 = [2473, 2474] | 1,276 | 1,0879 | Rp987.522 | |
| | 9 | g1 = [2469, 2470, 2471] | 1,2426 | 0,6658 | Rp777.048 | Rp1.970.230 |
| | | g2 = [2472, 2473] | 1,2478 | 1,1959 | Rp864.017 | |
| | | q3 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 10 | g1 = [2469, 2470, 2471, 2472] | 1,2399 | 0,8227 | Rp1.070.928 | Rp1.890.000 |
| | | g2 = [2473] | 1,2056 | 1,6246 | Rp489.908 | |
| | | q3 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |

| k | No | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2,tg3,tg4) |
|---|----|-------------------------|---------|--------|-------------|-----------------------|
| 4 | 1 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.981.956 |
| | | g2 = [2470] | 1,1682 | 1,6773 | Rp234.721 | |
| | | g3 = [2471] | 1,2332 | 0,7863 | Rp227.399 | |
| | | g4 = [2472, 2473, 2474] | 1,2531 | 1,2254 | Rp1.219.441 | |
| | 2 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp2.035.449 |
| | | g2 = [2470] | 1,1682 | 1,6773 | Rp234.721 | |
| | | g3 = [2471, 2472] | 1,2320 | 1,0694 | Rp512.812 | |
| | | g4 = [2473, 2474] | 1,2760 | 1,0879 | Rp987.522 | |
| | 3 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.967.418 |
| | | g2 = [2470] | 1,1682 | 0,8598 | Rp234.721 | |
| | | g3 = [2471, 2472, 2473] | 1,2488 | 1,0530 | Rp1.103.138 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 4 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp2.025.900 |
| | | g2 = [2470, 2471] | 1,2081 | 1,0145 | Rp474.513 | |
| | | g3 = [2472] | 1,2056 | 1,7145 | Rp263.471 | |
| | | g4 = [2473, 2474] | 1,2760 | 1,0879 | Rp987.522 | |
| | 5 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.968.089 |
| | | g2 = [2470, 2471] | 1,2081 | 1,0145 | Rp474.513 | |
| | | g3 = [2472, 2473] | 1,2478 | 1,1959 | Rp864.017 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 6 | g1 = [2469] | 1,3082 | 0,3625 | Rp300.395 | Rp1.866.040 |
| | | g2 = [2470, 2471, 2472] | 1,2113 | 1,1701 | Rp746.573 | |
| | | g3 = [2373] | 1,2859 | 1,6246 | Rp489.908 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 7 | g1 = [2469, 2470] | 1,2390 | 0,7064 | Rp548.721 | Rp2.027.113 |
| | | g2 = [2471] | 1,2332 | 0,7863 | Rp227.399 | |
| | | g3 = [2472] | 1,2056 | 1,7145 | Rp263.471 | |
| | | g4 = [2473, 2474] | 1,2760 | 1,0879 | Rp987.522 | |
| | 8 | g1 = [2469, 2470] | 1,2390 | 0,7064 | Rp548.721 | Rp1.969.302 |
| | | g2 = [2471] | 1,2332 | 0,7863 | Rp227.399 | |
| | | g3 = [2472, 2473] | 1,2478 | 1,1959 | Rp864.017 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 9 | g1 = [2469, 2470] | 1,2390 | 0,7064 | Rp548.721 | Rp1.880.606 |
| | | g2 = [2471, 2472] | 1,2320 | 1,0694 | Rp512.812 | |
| | | g3 = [2373] | 1,2859 | 1,6246 | Rp489.908 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |
| | 10 | g1 = [2469, 2470, 2471] | 1,2426 | 0,6658 | Rp777.048 | Rp1.859.591 |
| | | g3 = [2472] | 1,2056 | 1,7145 | Rp263.471 | |
| | | g3 = [2373] | 1,2859 | 1,6246 | Rp489.908 | |
| | | q4 = [2474] | 1,2401 | 1,6352 | Rp329.165 | |

| k | No. | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2,tg3,tg4,tg5) |
|---|-----|----------------------|---------|-------|-----------|---------------------------|
| 5 | 1 | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp2.013.507 |
| | | g2 = [2470] | 1,1682 | 1,677 | Rp234.721 | |
| | | g3 = [2471] | 1,2332 | 0,786 | Rp227.399 | |
| | | g4 = [2472] | 1,2056 | 1,714 | Rp263.471 | |
| | | g5 = [2473, 2474] | 1,276 | 1,088 | Rp987.522 | |
| | 2 | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp1.955.696 |
| | | g2 = [2470] | 1,1682 | 1,677 | Rp234.721 | |
| | | g3 = [2471] | 1,2332 | 0,786 | Rp227.399 | |

| k | No. | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2,tg3,tg4,tg5) |
|---|-----|----------------------|---------|-------|-----------|-------------------------------|
| | | g4 = [2472, 2473] | 1,2478 | 1,196 | Rp864.017 | |
| | | g5 = [2474] | 1,2401 | 1,635 | Rp329.165 | |
| | 3 | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp1.867.000 |
| | | g2 = [2470] | 1,1682 | 1,677 | Rp234.721 | |
| | | g3 = [2471, 2472] | 1,232 | 1,069 | Rp512.812 | |
| | | g4 = [2373] | 1,2859 | 1,625 | Rp489.908 | |
| | | g5 = [2474] | 1,2401 | 1,635 | Rp329.165 | |
| | 4 | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp1.857.451 |
| | | g2 = [2470, 2471] | 1,2081 | 1,015 | Rp474.513 | |
| | | g3 = [2472] | 1,2056 | 1,714 | Rp263.471 | |
| | | g4 = [2373] | 1,276 | 1,625 | Rp489.908 | |
| | | g5 = [2474] | 1,2401 | 1,635 | Rp329.165 | |
| | 5 | g1 = [2469, 2470] | 1,239 | 0,706 | Rp548.721 | Rp1.858.664 |
| | | g2 = [2471] | 1,2332 | 0,786 | Rp227.399 | |
| | | g3 = [2472] | 1,2056 | 1,714 | Rp263.471 | |
| | | g4 = [2373] | 1,2859 | 1,625 | Rp489.908 | |
| | | g5 = [2474] | 1,2401 | 1,635 | Rp329.165 | |
| k | No. | Grouping Maintenance | β | tg | ETC (tg) | ETC (tg1,tg2,tg3,tg4,tg5,tg6) |
| 6 | 1. | g1 = [2469] | 1,3082 | 0,363 | Rp300.395 | Rp1.845.058 |
| | | g2 = [2470] | 1,1682 | 1,677 | Rp234.721 | |
| | | g3 = [2471] | 1,2332 | 0,786 | Rp227.399 | |
| | | g4 = [2472] | 1,2056 | 1,714 | Rp263.471 | |
| | | g5 = [2373] | 1,2859 | 1,625 | Rp489.908 | |
| | | g6 = [2474] | 1,2401 | 1,635 | Rp329.165 | |
| | | | | | | |

Lampiran 4 : Grouping Maintenance Komatsu Berdasarkan Availability

| k | Grouping Maintenance | TTF | | TTR | | MTTF | MTTR | Availability | Availability Rata-rata |
|---|---|----------|---------|----------|---------|--------|-------|--------------|------------------------|
| | | α | β | α | β | | | | |
| 1 | g1 = [2469, 2470, 2471, 2472, 2473, 2474] | 47,216 | 1,249 | 1,857 | 1,017 | 43,988 | 1,844 | 95,9761% | 95,9761% |
| 2 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 96,0665% |
| | g2 = [2470, 2471, 2472, 2473, 2474] | 46,595 | 1,227 | 1,881 | 1,005 | 43,585 | 1,877 | 95,871% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,9750% |
| | g2 = [2471, 2472, 2473, 2474] | 47,016 | 1,253 | 1,825 | 0,998 | 43,766 | 1,827 | 95,993% | |
| | g1 = [2469, 2470, 2471] | 47,439 | 1,243 | 1,792 | 1,042 | 44,244 | 1,762 | 96,169% | 95,7582% |
| | g2 = [2472, 2473, 2474] | 46,674 | 1,253 | 2,061 | 0,940 | 43,447 | 2,120 | 95,347% | |
| | g1 = [2469, 2470, 2471, 2472] | 46,506 | 1,240 | 1,818 | 1,027 | 43,396 | 1,798 | 96,021% | 95,7937% |
| | g2 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | g1 = [2469, 2470, 2471, 2472, 2473] | 46,767 | 1,248 | 1,878 | 1,014 | 43,578 | 1,867 | 95,892% | 96,3489% |
| | g2 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| 3 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9980% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471, 2472, 2473, 2474] | 47,016 | 1,253 | 1,825 | 0,998 | 43,766 | 1,827 | 95,993% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9052% |
| | g2 = [2470, 2471] | 46,561 | 1,208 | 1,797 | 1,036 | 43,723 | 1,771 | 96,107% | |
| | g3 = [2472, 2473, 2474] | 46,674 | 1,253 | 2,061 | 0,940 | 43,447 | 2,120 | 95,347% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9109% |
| | g2 = [2470, 2471, 2472] | 45,400 | 1,211 | 1,832 | 1,017 | 42,604 | 1,819 | 95,905% | |
| | g3 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 96,2692% |
| | g2 = [2470, 2471, 2472, 2473] | 45,896 | 1,224 | 1,912 | 1,001 | 42,958 | 1,911 | 95,740% | |
| | g3 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,9808% |
| | g2 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g3 = [2472, 2473, 2474] | 46,674 | 1,253 | 2,061 | 0,940 | 43,447 | 2,120 | 95,347% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,8706% |
| | g2 = [2471, 2472] | 45,142 | 1,232 | 1,728 | 1,016 | 42,187 | 1,717 | 96,089% | |

| k | Grouping Maintenance | TTF | | TTR | | MTTF | MTTR | Availability | Availability Rata-rata |
|---|-------------------------------|----------|---------|----------|---------|--------|-------|--------------|------------------------|
| | | α | β | α | β | | | | |
| 4 | g3 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | 96,1907% |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | |
| | g2 = [2471, 2472, 2473] | 45,927 | 1,249 | 1,864 | 0,991 | 42,785 | 1,871 | 95,809% | |
| | g3 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470, 2471] | 47,439 | 1,243 | 1,792 | 1,042 | 44,244 | 1,762 | 96,169% | 95,5216% |
| | g2 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g3 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | g1 = [2469, 2470, 2471] | 47,439 | 1,243 | 1,792 | 1,042 | 44,244 | 1,762 | 96,169% | 95,8487% |
| | g2 = [2472, 2473] | 44,344 | 1,248 | 2,266 | 0,909 | 41,318 | 2,372 | 94,571% | |
| | g3 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470, 2471, 2472] | 46,506 | 1,240 | 1,818 | 1,027 | 43,396 | 1,798 | 96,021% | 95,1448% |
| | g2 = [2472] | 40,453 | 1,206 | 2,810 | 0,861 | 38,007 | 3,034 | 92,607% | |
| | g3 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9966% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g4 = [2472, 2473, 2474] | 46,674 | 1,253 | 2,061 | 0,940 | 43,447 | 2,120 | 95,347% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9140% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471, 2472] | 45,142 | 1,232 | 1,728 | 1,016 | 42,187 | 1,717 | 96,089% | |
| | g4 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 96,1540% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471, 2472, 2473] | 45,927 | 1,249 | 1,864 | 0,991 | 42,785 | 1,871 | 95,809% | |
| | g4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,6910% |
| | g2 = [2470, 2471] | 46,561 | 1,208 | 1,797 | 1,036 | 43,723 | 1,771 | 96,107% | |
| | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g4 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,9364% |
| | g2 = [2470, 2471] | 46,561 | 1,208 | 1,797 | 1,036 | 43,723 | 1,771 | 96,107% | |
| | g3 = [2472, 2473] | 44,344 | 1,248 | 2,266 | 0,909 | 41,318 | 2,372 | 94,571% | |
| | g4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,7016% |
| | g2 = [2470, 2471, 2472] | 45,400 | 1,211 | 1,832 | 1,017 | 42,604 | 1,819 | 95,905% | |
| | g3 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | g4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,7477% |
| | g2 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |

| k | Grouping Maintenance | TTF | | TTR | | MTTF | MTTR | Availability | Availability Rata-rata |
|---|-------------------------|----------|---------|----------|---------|--------|-------|--------------|------------------------|
| | | α | β | α | β | | | | |
| | g4 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | 95,9930% |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | |
| | g2 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g3 = [2472, 2473] | 44,344 | 1,248 | 2,266 | 0,909 | 41,318 | 2,372 | 94,571% | |
| | q4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,6714% |
| | g2 = [2471, 2472] | 45,142 | 1,232 | 1,728 | 1,016 | 42,187 | 1,717 | 96,089% | |
| | g3 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | g4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470, 2471] | 47,439 | 1,243 | 1,792 | 1,042 | 44,244 | 1,762 | 96,169% | 95,4096% |
| | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g3 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | q4 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,8069% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g4 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g5 = [2473, 2474] | 50,948 | 1,276 | 2,125 | 0,935 | 47,237 | 2,191 | 95,566% | |
| 5 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 96,0032% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g4 = [2472, 2473] | 44,344 | 1,248 | 2,266 | 0,909 | 41,318 | 2,372 | 94,571% | |
| | g5 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,7459% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471, 2472] | 45,142 | 1,232 | 1,728 | 1,016 | 42,187 | 1,717 | 96,089% | |
| | g4 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | g5 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,5936% |
| | g2 = [2470, 2471] | 46,561 | 1,208 | 1,797 | 1,036 | 43,723 | 1,771 | 96,107% | |
| | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g4 = [2373] | 50,948 | 1,276 | 2,810 | 0,861 | 47,237 | 3,034 | 93,965% | |
| | g5 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| | g1 = [2469, 2470] | 47,608 | 1,239 | 1,895 | 1,030 | 44,432 | 1,872 | 95,957% | 95,6128% |
| | g2 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g3 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g4 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | g5 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |
| 6 | g1 = [2469] | 49,158 | 1,308 | 1,790 | 1,041 | 45,344 | 1,761 | 96,262% | 95,6847% |
| | g2 = [2470] | 45,869 | 1,168 | 2,006 | 1,103 | 43,459 | 1,934 | 95,739% | |
| | g3 = [2471] | 47,263 | 1,233 | 1,583 | 1,081 | 44,158 | 1,536 | 96,638% | |
| | g4 = [2472] | 40,453 | 1,206 | 1,999 | 0,925 | 38,007 | 2,072 | 94,829% | |
| | g5 = [2373] | 49,879 | 1,286 | 2,810 | 0,861 | 46,171 | 3,034 | 93,834% | |
| | g6 = [2474] | 52,097 | 1,240 | 1,615 | 1,017 | 48,612 | 1,604 | 96,806% | |

Lampiran 6 : Penjadwalan *Grouping Maintenance Policy*

| Hari ke- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 1 | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 3 | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | | | | | | | | | | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 5 | | | | | | | | | | | | | | | | 6 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 7 | | | | | | | | | | | | | | | | 8 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 9 | | | | | | | | | | | | | | | | 10 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 11 | | | | | | | | | | | | | | | | 12 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 13 | | | | | | | | | | | | | | | | 14 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- 10 menit ke- | 15 | | | | | | | | | | | | | | | | 16 | | | | | | | | | | | | | | | |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 17 | | | | | | | | | | | | | | | | 18 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | | | | | | | | | | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 19 | | | | | | | | | | | | | | | | 20 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | | | | | | | | | | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 21 | | | | | | | | | | | | | | | | 22 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 23 | | | | | | | | | | | | | | | | 24 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | | | | | | | | | | | | | |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 25 | | | | | | | | | | | | | | | | 26 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 27 | | | | | | | | | | | | | | | | 28 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 29 | | | | | | | | | | | | | | | | 30 | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 10 menit ke- | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 menit ke- | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Hari ke- | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 menit ke- | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| HDT2301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2302 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2306 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2472 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HDT2474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |